Analyzing the Effectiveness of Transboundary Water Regimes: The Case of Lake Victoria Basin, East Africa

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ABSTRACT

This thesis examines the effectiveness of transboundary water regimes. Water is the only scarce resource for which there is no known substitute. However, ecological sustainability of shared water resources is being lost in many countries as current international frameworks suffer from differences that exist between institutional functions, practices, objectives, and bio-physical properties. To address this gap, this thesis starts from the premise that analyses of the effectiveness of transboundary water regimes are capable of shedding light to prescribe transboundary water governance.

This thesis explores effectiveness of a transboundary water regime in Africa, principally the Lake Victoria Basin, home to largest freshwater lake in Africa, and second largest lake in the world. It is an important source of local and international freshwater fisheries, benefiting about 35 million people locally. As such, the basin provides a globally significant but surprisingly under-researched venue for testing theoretical interpretations of transboundary water regime effectiveness using state of the art methodological approaches. By employing a Regime Analytic Levels Process model, never used before, data were collected through elite interviews and documentary analysis, analyzed, and then synthesized.

The results are as follows. The regime creation process (***inputs***) was dominated by process factors mainly in implementing the operational directives of donors and development partners, rather than understanding the underlying problem factors. The regime architecture analysis ***(outputs)*** suggests that procedural (rather than substantive) characteristics formed the basis of the regime's architecture. The regime ***impacts*** analysis show**s** the regime underperformed in relation to those components that addressed substantive concerns.

The global ***effectiveness*** of the regime was 41.6 per cent, basically procedural in character. This suggests it failed to establish a 'duty of care' with insufficient 'programme of measures' that governed the conduct of actors in the long term. These findings suggest the regime is not sustainable. The following recommendations are suggested: to focus donor effort on substantive characteristics to socialize actors via a 'duty of care'; to establish secure sources of funding to support long-term efforts; to merge the regime with wider national-level activities in the basin; and to establish a sufficient programme of measures, inform and prevent.

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ABREVIATIONS

AHP-Analytic Hierarchy Process
APTEMAP-Agreement for the Preparation of Environmental Management Programme
BICC-Bonn International Conventions Centre
BMU-Beach Management Unit
CBD-Convention on Biological diversity
CGG- Commission on Global Governance
DANIDA-Danish International Development
DfID-Department of International Development
EA Treaty- East Africa Treaty or East Africa Community Treaty
EAC Treaty- East Africa Community Treaty or East Africa Treaty
EAC-East Africa Community
EAFFRO- East Africa Fisheries Research Organization
ECOVIC- The East Africa Community Organization for the Management of Lake Victoria
EU-European Union
FAO-Food and Agriculture Organization
GEF -Global Environmental Facility
GOK-Government of Kenya
GOT-Government of Tanzania
GOU-Government of Uganda
GWP-Global Water Partnership
IL-International Law
IMF-International Monetary Fund
IR-International Relations
ISESCO- Islamic Educational, Scientific and Cultural Organization
LVB-Lake Victoria Basin
LVBC-Lake Victoria Basin Commission
LVEMP-Lake Victoria Environment Management Programme
LVFO-Lake Victoria Fisheries Organization
LV Protocol-Lake Victoria Protocol
RALP-Regime Analytic Level Process
UNCSD-United Nations Convention for Sustainable Development
UNDP-United Nations Development Programme
UNEP-United Nations Environment Programme
UNESCO-United Nations
UN-United Nations
WB-World Bank
WOM-World Order Model
WWAP-World Water Assessment Programme
WWC - World Water Commission
WWF- World Water Forum

Chapter One

CHAPTER 1

Rethinking Problem-solving Capacity of Transboundary Water Governance: The Role of Regime Effectiveness Research

> *"The principle target of effectiveness research is the capacity of political institutions to solve commonly perceived problems". (Young 1999a: 4)*

Introduction

The significance of water as essential in supporting life, socio-economic development and socio-ecological well-being deserves no further elaboration. But finding ways to ensure it is governed effectively remains a perennial challenge. Unfortunately, Castro (2007) observes that, despite significant efforts in recent decades, the struggle to limit the negative impacts of water-related hazards and deficiencies is being lost in many countries. Many have either been hurriedly done, with little understanding of intended problem (Conca 2006; Castro 2007) or lack sufficient understanding of the matters concerned (Howarth 2006). For these reasons, Rogers (2002) raises fundamental questions about the problem solving capacity of water governance: the capability of social systems to mobilize energies, in a coherent manner for sustainable development and efficient use of water resources. While general principles of international water law exist, their capacity in resolving transboundary water problems has remained scant (Frederiksen 1992; Wolf 1997; Marty 1997; Barnuer 2002).

Breitmeier and others (2007) identified two concerns among those who remain sceptical about the problem-solving capacity of institutions, namely: limitations arising from pressure to arrive at collective decisions by consensus, and those arising from the lack of capacity to enforce collective decisions once they have been accepted in principle. Esty and Ivanova

(2001) observed that the current water resources degradation, especially in relation to transboundary water resources, has spurred interest in rethinking and possibly improving problem-solving capacities, chiefly by restructuring institutional 'architecture': that is 'the clusters of norms, principles, institutions and regimes' that constitute governance in the absence of world government (Biermann *et al.* 2009).

Regimes are defined as "institutions or sets of principles, norms, rules and decision-making procedures around which actors expectations converge that govern conduct towards sustainable utilization of international common" (Vogler 2000:17).This thesis starts from the assumption that analyzing the effectiveness of current transboundary water regimes can, if properly designed, shed new light on the kinds of institutional reforms needed to increase their problem-solving capacity. However, effectiveness defined as "how successfully transboundary water governance solve intended problem(s)" (Solanes and Jouravlev 2006:7) is a contested concept. Effectiveness as applied to transboundary water governance institutions figures as components of causal clusters whose individual elements are hard to disentangle (*Ibid*). Biermann and Barneur (2005) observed current effectiveness analysis approaches, tools and procedures are limited and are mostly focused on major/global treaties and conventions, with less or almost none at regional or basin level. Very few if any have been undertaken in developing country contexts.

The rest of this chapter unfolds as follows. Section 2 briefly examines the management of transboundary water ecosystems. It also explores the different stresses facing global freshwater ecosystems. Section 3 reflects on the nature of transboundary water governance and the critical role of problem-solving capacity. Section 4 explores the concept of

transboundary water regimes, while Section 5 considers how the effectiveness of international regimes can be better understood. Section 6 provides an overview on the application on a Regime Analytic Level Process (RALP) Model, an extension of regime analysis (Nijkamp 1990) and Analytic Hierarchy Process (AHP) (Saaty 1990) methodologies, to analyze the effectiveness of transboundary water regimes. Section 7 offers a 'partial' approach to transboundary water regime effectiveness analysis.

Section 8 explores the effectiveness of transboundary water regimes in Africa while Section 9 introduces a case study of effectiveness centring on the Lake Victoria Basin, East Africa. It then outlines the main aim and objectives of this thesis. Section 10 briefly reviews the different international relations perspectives on regime effectiveness analysis and finally, Section 11 draws together the main features of the analysis and identifies its most significant and novel aspects.

Managing transboundary water ecosystems

According to Nakayama (2003: 1) there are more than 260 international water systems (rivers and lakes) in the world, with over 60 per cent of the world population residing within them. However, a very small percentage of water on earth is fresh water (about 2.5 per cent). The proportion of this water available for human use is estimated at just 0.01 per cent[1] (Gleick 2000: 21-22). Freshwater has become increasingly scarce (*Ibid*), with the gap between supply and demand, growing (UNCSD-CAFR 1997) particularly in the past century[2].

[1] Gleick (2000) also indicates this portion is also located far from human populations.
[2] The assessment also speak of trends such as a steady increase in the number of regions of the world where human demands are outstripping local water supplies, and the resulting water stress is limiting development, especially in poor societies UNCSD-CAFR, United Nations, New York, E/CN.17/1997/9.

Similarly, the concern over the management and allocation of international freshwater worldwide has also grown over the past century (Giordano and Wolf 2003: 71). According to the United Nations (UN), the primary concern has been over "the existence and threats of adverse effects, in short and long term of the changes of transboundary watercourses and international lakes on the environment, economies and well-being of the member countries" (Preamble UN Water Convention 1992, paragraph 2).

The United Nations (1992) observed that, "the protection and use of transboundary watercourses and international lakes are important and urgent tasks" that demand enhanced cooperation (Preamble UN Water Convention 1992, paragraph 1). Such cooperation has to strengthen national and international measures to prevent, control and/or reduce the release of hazardous substances into the aquatic environment, to abate eutrophication and acidification, and promote sustainable catchment management for freshwater ecosystems (paragraph 3, Preamble UN Water Convention 1992).

Ecosystems under different stresses

Examination of world freshwater ecosystems reveals that they have been subjected to a number of stresses which arise from a number of sources (WWAP 2003.). Amongst such sources are the impact of human development in the form of land-use changes and transformation of surrounding landscapes by deforestation, settlement, and agricultural land conversion that adversely affects freshwater ecosystems (*Ibid*). Already, it is estimated that almost one third of the world's watershed has been lost and more than 75 per cent of the remainder has lost its original forest cover (Revenga *et al.* 2000). Deforestation alters local

water, nutrient and energy cycles in many ways because forests play a major role in shaping local processes of run-off, soil stabilization, soil structure, evapotranspiration, and micro-climate energy flows (Conca 2006: 75).

On the other hand, water pollution arising from the discharge of heavy metals, persistent organic pollutants, and other chemical contaminants; dumping of untreated or inadequately treated sewage; and excessive loading of the nutrients such as phosphorus and nitrates are leading problems of freshwater ecosystems (UNCSD 1997). This has led to accelerated growth of algae, declining oxygen content, and enhanced eutrophication of global freshwater bodies (*Ibid*). The leading sources of regional water pollution have been found to be discharge of raw sewage and industrial waste, irrigation induced salinity, high sediment loading and acid dispositions (UNCSD 1997). Many of these pressures are growing as population expands (WRI, 1998).

This thesis suggests management of transboundary freshwater ecosystems should be informed by analyzing the effectiveness of relevant management regimes. According to Born and Sonzogni (1995) sustainable management of transboundary freshwater ecosystems refers to the holistic and/or integrated environmental management of goods and services from these ecosystems in order to improve the well-being of present and future generations.

According to the United Nations Water Convention (1992), the aim of holistic management is to integrate management of water resources, including: maintenance of ecosystem integrity according to a management principle for preserving aquatic ecosystems, with

"the overall goal being to maintain the functioning of the ecosystem, and to protect water quality as a basis for sustainable development" (Chapter 18 Agenda 21, UNCED 1992).

Effective management of transboundary water resources of course requires coordinated actions among different governments (Barrett 2006: 104). According to Barrett (2006), the increasing number of regimes at the global level poses a challenge to those wishing to analyze effectiveness. Indeed the more complex the analysis of transboundary water governance has become, the more difficult it is to judge whether a given regime needs to be modified, or even completely replaced (*Ibid*). This study analyzes transboundary water regime effectiveness and assesses how far it is able to contribute to improving the problem-solving capacity of international water governance.

Transboundary water governance: a complex challenge?

Understanding governance

According to Biermann (2006: 238), "governance refers to the notion of self-regulation by societal actors, or private-public cooperation to solve societal problems and new forms of multilevel policy". Governance as a concept has been widely discussed within the field of politics (See Van Kersbergen and Van Waarden, 2004) and development policy (de Alcantara 1998: 105: Cziempel *et.* al 2003). One of the greatest challenges facing mankind remains the governance of scarce natural resources. According to Van Kersbergen and Van Waarden (2004) governance has been more difficult to achieve at the international level than at the national level. They argue this is due to the following challenges.

Firstly, there is the self-interests of states and lack of understanding on the substance of governance. Ward and Dubos (1972: 294) observed that many states are confined within their units, possessive over national rights, and suspicious of any extension of international authority. Secondly, one needs to understand the concept of governance. Thirdly, transboundary water governance is complicated by the context or varying nature of water ecosystems. According to BICC (2007) governing transboundary river ecosystem differs from transboundary lake ecosystem. The latter is considered more challenging as standing water makes a unique ecosystem different from running water (*Ibid*).

> "Lake water has what science calls residence time, thus not so much renewable. It is also inhabited by different organisms that depend so much on one another. If one of these organisms is disturbed the whole ecosystem is disrupted" (BICC 2007).

When shared by many states, the governance of lake ecosystems becomes very onerous. Also, it is often difficult to mark a boundary on open water. It is important therefore to establish operational social institutions capable for resolving conflicts, facilitating cooperation, or, more generally, alleviating collective action problems in a world of interdependent states (Young 1994: 15).

There are many scholarly interpretations of the concept of governance. However, they can be categorized into the following five dimensions, namely: governance as inputs; governance as output; governance as outcome; governance as impact; and governance as effectiveness.

Governance as input refers to – "those processes that create the conditions for ordered rule and collective action within the political realm" (Stoker 2004: 22). With this conceptualization, water governance is defined as a process of collective action in order to understand problem factors and create ordered rule (*process factors*). It includes the ability to collectively identify, conceptualize, contextualize, and perceive the pressure of water problems. This understanding guides policy creation processes including agenda setting and negotiation processes.

Governance as outputs' (or 'architecture') refers to the notion of interconnectedness of units that form the governance system (sovereign states) or international system (Waltz 1979: 79). According to Wood and associates (2001), governance is the exercise of economic, political and administrative authority to manage a country's affairs at all levels. It comprises the mechanisms, processes and institutions by which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences (*Ibid*). As such, GWP (2002, 2003) define "water governance as the range of political, social, economic and administrative systems that are in place to develop and management water resources, and the delivery of water services, at different levels of society".

Water governance as output or architecture therefore, refers to the interconnectedness of the units that form a water or hydrologic system. It is seen as a structure within which actors and contexts of a hydrologic system interact. According to Lankford and Mwaruvanda (2005), transboundary water governance architecture must explore various allocation devices, involve and recognize many stakeholders, accommodate issues of scale and timing, and be underpinned by appropriate legal and institutional framework.

Governance as outcomes refers to the capability of social systems to mobilize energies in a coherent manner for sustainable development. This is based on the premise that to mobilze energy to address a commonly perceived problem involves change in behaviour. Water governance is the capability of a social system to mobilize energies, in a coherent manner, for sustainable development of water resources (GWP 2003). Transboundary water governance requires capacity generate and implement appropriate policies. Such capacities come as a result of established consensus with coherent management systems based on institutions, laws, cultural factors, knowledge and practices as well as adequate administration founded on acceptance, social participation, and capacity building (Commission on Global Governance 1995: 4). This should include formal institutions empowered to enforce compliance as well as informal arrangements that people or institutions have agreed or perceive to be in their interest (*Ibid*). Thus, water governance as outcome literally means behaviour change.

Governance as impact is where actors' decisions cause them to perform at least in some measures as part of the whole. Water governance as impact refers to sufficient contact to impose changes on stakeholders' characteristics towards attaining intended goals (Bulls 1997). Water governance as impact involves adapting to set rules with indication of significant changes towards attaing intended goals. Lastly, '*governance as effectiveness'* implies a "notion of self-regulation by societal actors or private-public cooperation in solving of societal problems" (Biermann 2006: 238). It is when actors internalize the set rules to improve their welfare without much enforcement of set rules. Water governance implies self-regulation by actors for solving societal water problems. To achieve this level of governance, Solanes and Jouravlev (2006: 7) suggested that, effective water governance must be transparent, open, accountable, participatory, communicative, incentive-based, sustainable, equitable, coherent, efficient, integrative and ethical. However, Roger and Hall (2003) noted

that there are varied definitions and understandings of the term "water governance" and it has to be carefully defined. The following subsections explain some basin prerequisites for attaining effective water governance.

Water governance: some basic pre-requisites

Vogler (2000: 16) argued that water governance has to be carefully defined. As noted from the foregone analysis, 'water governance as input' is quite narrow and cannot easily be alleviated by states acting in isolation or by creating incomplete transboundary interventions (*Ibid*). Steduto and Kuylenstierna (2009) asserted that water governance take the following multiple roles. First, it is multifunctional: bordering on aspects of climate change, energy, food security, and economic development all trickling down to availability and utilization of water. These factors constitute the main areas of the problem when analyzing water governance (see Chapter 2). Secondly, water governance is multi-scaled: in most cases strategies related to sustainable development focus on water resources management involving all scales from local to international.

Thirdly, water governance is multi-layered: it frequently functions as the link between climate system and human society (*Ibid*). Understanding these linkages is important when an attempt is made to identify key problem factors (Chapter 2). Finally, water governance is multi-faceted: no single actor can claim to have full mandate over water management (*Ibid*).

In this study, water governance is conceptualized as a holistic establishment of 'duty of care' by all stakeholders sufficient to solve problems. Howarth (2008) and Wouters (2009) asserted

that an understanding of substantive content forms an integral part for the whole process governance proces. It forms the normative system for legitimate reconciliation of stakeholders' activity (Wouters, 2009). Wouters argued that, when properly drafted and implemented, substantive rules of international law provide a solid foundation for effective transboundary water governance (*Ibid*). However, Conca (2006) observed that the process of building consensus to establish substantive rules still remains a complex challenge in transboundary water governance due to the many actors involved. As such, water governance proceedes under the notion of regimes. The following subsection explores the concept of transboundary water regimes.

Transboundary water regimes

Since early AD 805, the management of transboundary water has been in the form of regimes (FAO 1970). Marty (2001) referred to water regimes as: explicit or implicit, formal or informal principles, norms, rules and procedures shaping the cooperation of the riparian states involved. Lindemann (2006) referred to transboundary water regimes as: "norm and rule based cooperation for the political resolution of problems and conflicts in the field of transboundary water basin management". However, from the foregoing analysis this thesis claims there is something more to the definition of water regimes that has yet to be explored. This debate on the definition of transboundary water regime is further explored in Chapter 2.

Important among international water regimes is the 1992 Dublin Water Principles which stated the main issues and thrust of water management, with due respect to international freshwater environmental governance (GWP 2003). These principles are as follows:

> "freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels. Women play a central part in the provision, management, and safeguarding of water. Water has an economic value in all its competing uses, and should be recognised as an economic good"

These governing principles were later summarized as: the principle of clarifying and maintaining a system of property rights; the principle of participatory management; and principle of meaningful decentralization to the lowest appropriate level (subsidiarity) (*Ibid*).

The international community further addressed the problem of international water management through generalized principles. The United Nations Food and Agriculture Organization (1985) identified more than 3600 treaties dating back to AD 805, relating to international waters. The majority of these initially dealt with aspects of navigation but not until 1977 at the United Nations (UN) Water Conference, did the international community acknowledged the critical role of environmental management in international water management (Giordano and Wolf 2003:71).

To govern conduct in shared freshwater lakes, the international community developed the 1996 Helsinki Agreement (Convention on the Protection and Use of Transboundary Watercourses and International Lakes). This was later reformulated as the 1996 Helsinki Rules on the use of waters of international rivers, which significantly considered freshwater

shared lakes (*Ibid*). Further efforts by United Nations General Assembly occurred in 1997 when the United Nations Convention on the Law of the Non-Navigational Use of international Watercourses was adopted (the UN Watercourse Convention) (*Ibid*).

However, the First World Water Development Report released by UNESCO's World Water Assessment Programme (2003) proclaimed a world water crisis rooted in ineffective water management (WWAP, 2003). The current international frameworks suffer from differences that exist between institutional functions, practices, objectives and bio-geographical properties (Moss 2004). According to Conca (2006), competing forces influence the search for effective water governance at the international level, with national interests very often pitted against international interests (*Ibid*). Such contradictory forces have failed sustainable water management at the international level with resultant effects of environmental degradation (*Ibid*).

Research on transboundary water regimes analysis is therefore urgent if they are to solve transboundary water problems. The effect of current regimes has been regularly questioned, with some wondering whether they 'matter' at all (Haggard and Simons 1987; Tooze 1990; Milner 1992; Young and Underdal 1995; Stokke 1997; Vogler 2000). Investigating the problem-solving capacity (effect) of current regime systems on transboundary water is therefore imperative. The following section explores the art and science of transboundary water analysis.

Analyzing the effectiveness of transboundary water regimes

Until recently, studies on transboundary water regimes have been descriptive, with few being evaluative. Regime scientists have brought limited prescriptive results to inform reforms in transboundary water governance. Firstly, studies have emphasized the importance of key drivers identification, incentive structure (benefit sharing), and constraints (e.g. Lautze and Giordano 2005; Marty 2001; Mitchell and Keilbach 2001; Sadoff and Grey 2002; Klaphake and Scheumann 2006). However, Scheumann and Moss (2005) argued that water regimes in Africa exhibit different characteristics in terms of their scope, specificity, regime organizations, financing rules, information exchange, dispute settlement rules and participation of non-governmental organizations. These characteristics make them unique to analyze, both theoretically and methodologically.

Secondly, studies have pursued the hydro-hegemony and hegemonic stability theory to analyze transboundary water regimes (Furlong 2006; Zeitouni *et al.* 2006; Agnew and Corbridge 1995). Thirdly, those studies focused on international relations/international organization theoretical perspectives (Swatuk and Vale 2000; DuPlessis 2000). Fourthly, there are those studies which analyzed colonial legacies (Fekoua 2000). Lastly, include those studies that analyzed risks of serious water conflicts i.e. 'water wars' (Turton 2003a, 2003b; Phillips et. al. 2006).

Various schools have employed different criteria to analyze regime effectiveness. America and European have used behaviour change and problem solving as main determinants of regime effectiveness analysis. However, they do not fully analyze regime effectiveness as

problem-solving. This is because problem-solving, as a goal, is a dynamic process. Capturing this aspect would add value to international regimes effectiveness analysis.

Underdal (2002) based his analysis of environmental regime effectiveness on outputs, outcomes and impacts levels. However Stokke (2007) identified the need to be careful if we are to make causal inferences. He argued that the output-outcome-impact model is more of a 'political approach' that does not explain the contexts and processes applied by actors. For this reason, issue area evaluation through analysis of problem factors and process factors is fundamental to the analysis of the effectiveness of regime creation. Also, the evaluation of transfer of authority processes, the regime architecture, is significant for effectiveness analysis for problem-solving. Such a level-by-level analysis of processes and outcomes reveal the nature of the cause and effects at each level relevant for overall analysis of regime effectiveness. It is clear from the foregoing analysis that, effectiveness analysis has to grapple with many different criteria. This study builds an 'input' level into Underdal's (2002) output-outcome-impact model to qualify the above effectiveness analysis criterion. By including the input component or level, it takes into account a context-mechanism-outcome approach employed by critical realists (see Chapter 3).

This thesis adopts a legal-moral analysis of transboundary water regimes effectiveness. It draws from the New Haven School (McDougal and Lasswell 1943) and World Order Model (WOM) (Falk, 1967) legal-moral foundations to analyze transboundary water regimes effectiveness. It is premised on the understanding that water is life, and the purpose of global water management should be patterned according to world public order that advances human fundamental values: core values that serve the interests of most community members, and the

legal process (Armstrong et al. 2007:88). A fundamemtal value of particular concern is 'human dignity': equity and human worth (*Ibid*), which must be taken into consideration as priority so as to develop a stable and sustainable world public order with the least cost to the environment and fellow humans. Thus, transboundary water regimes are not simply a system of rules to regulate state behaviour but rather as part and parcel of international policy and law which creates order through 'duty of care': the legal and moral obligation to observe human dignity in performing any act (*Ibid*). This is important for problem-solving in global water.

This analysis employs a Regime Analytic Level Process (RALP) model, never used before, as a tool for transboundary water regimes effectiveness analysis. The RALP model, unlike the Legal Assessment Model (LAM) developed by Wouters (2005) adopts a legal-moral approach to analyze the effectiveness of transboundary water regimes. It ascertains the content of transboundary water regimes by exploring regime creation process, regime architecture, regime outcomes, and regime impacts. In other words, it is prescriptive as well as descriptive (see Chapter 2).The RALP model assumes that regimes are dynamic processes is informed by the regime analysis method (Nijkamp et al., 1993) and the Analytic Hierarchy Process (AHP) method (Saaty 1990).

The RALP model derived from AHP approaches transboundary water regimes effectiveness analysis as follows. A transboundary water regime is decomposed into its hierarchical levels and analyzed i.e. considering how one level builds on to the other. The indicators of each level are subjectively weighed to generate data. In essence, expert judgements are used to analyze the status quo. Regime hierarchical levels are assessed on how successfully they

fulfil each levels expectations or goals, and how it subsequently influences the next level. As such the reliability and effectiveness of each level is determined. The overall or global transboundary water regime effectiveness is calculated from the levels' effectiveness. The RALP model approach is further explored in Chapter 3. The following sections highlight the RALP Model approach to effectiveness analysis.

The Regime Analytic Level Process model approach

A Regime Analytic Level Process (RALP) model is an Analytic Hierarchy Process (AHP) (Saaty, 1990, 1995) based on regime analysis method (Nijkamp *et al.*1993). It offers a broad framework for decision support for regional development (*Ibid*). According to Nijkamp the objective of regime analysis method is to quantitatively operationalize the concept of sustainability by defining a multi-criteria approach by which indicators a represented through a range of values utilizing normative concepts of critical threshold values (*Ibid*).

AHP is a multi-criteria analysis technique that provides an appropriate tool to accommodate conflicting views. It is also used to evaluate the relative importance of multiple criteria or multiple alternatives against a given criterion in natural resources and environmental management (Qureshi and Harrison, 2003: 443). Furthermore, it is an effective tool for eliciting expert knowledge and for the development of expert systems in natural resources management (Reynolds and Holsten1994). It can be applied to many and diverse areas of decision-support, with respect to natural resources management and environmental management (Qureshi and Harrison, 2003: 442), and can be used to rank or weigh environmental, social and economic objectives of policy options in a small watershed (Qureshi and Harrison 2003: 442-458).

AHP as a methodology has been used to study catchment management problems in Victoria, Australia (e.g. Itami and Cotter 1999). The result was a software package called 'Catchment Decision Assistant' which links AHP decision making framework to geographic information systems. It recorded the criteria and decision hierarchy; generated weights for each criterion; provided a framework for rating issues, projects, and sites against the criteria (Qureshi and Harrison, 2003).

Through this approach, a regime is decomposed, contextualized, and analyzed according to its context, operating mechanisms and its outcomes (Chapter 3). The RALP model constitutes the inputs, outputs, outcomes and impacts (see Figure 1). Box 1 defines the levels as applies to regime effectiveness analysis.

Box 1.1 Key levels in the Regime Analytic Level Process (RALP) model

Inputs – refer to processes and outcomes of problem factors and process factors including problem identification, conceptualization, contextualization, and problem pressure; and the drivers, agenda-setting and negotiation processes.
Outputs - refers to the architecture or characteristics that structure agreements for transfer of authority characteristics. Include substantive characteristics (i.e. the norms, principles, rules and decision making procedures) and procedural characteristics (i.e. procedural principles, procedures, practice, and organization).
Outcomes - refer to human behaviour changes i.e. the consequences of implementation and adaptation to the regime.
Impacts - refer to the regime consequences for problem solving. Include changes in social wellbeing and the state of biophysical environment.

Source: Modified from Underdal (2002).

Inputs

Inputs relates to problem factors that frame the context of international concern and process factors which frame the social system of the regime creation process. In the process factors, actors identify key driving forces and situations which make them realise the repercussions of an existing problem affecting them. This aspect is further explored in Chapters 2, 3, and 4.

Outputs

Outputs refer to the characteristics of agreements or their architecture. They are clusters of norms, principles, institutions or rules (Biermann 2009), derived from an understanding of the problem and process factors derived from inputs. These agreements take the form of conventions, treaties, protocols, or programme goals, characterized by substantive and procedural elements. Outputs are in form of principles, norms and rules that guide the regime (see Box 1). It is these regime outputs that transfer authority in a given issue area (See Chapters 2 and 5).

Outcomes

Outcomes refer to behaviour changes or the implementation of outputs. Outcomes simply refer to responses to the implementation of rules. They are important because the value of international environmental agreements is not in their negotiation but in their ability to influence human behaviour in ways that lessen environmental harm (See Chapter 2).

Impacts

Impacts refer to results of implementing agreed rules. They may be positive (i.e. leading to attainment of desired goals) or negative (i.e. resulting to worse conditions than were originally expected). Positive impacts may be attributes to the improvement of biophysical environment, seen as a result of transnational environmental management practices. This aspect is further explained in Chapters 2 and 6. These four levels are built into the RALP model (see Figure 1.1).

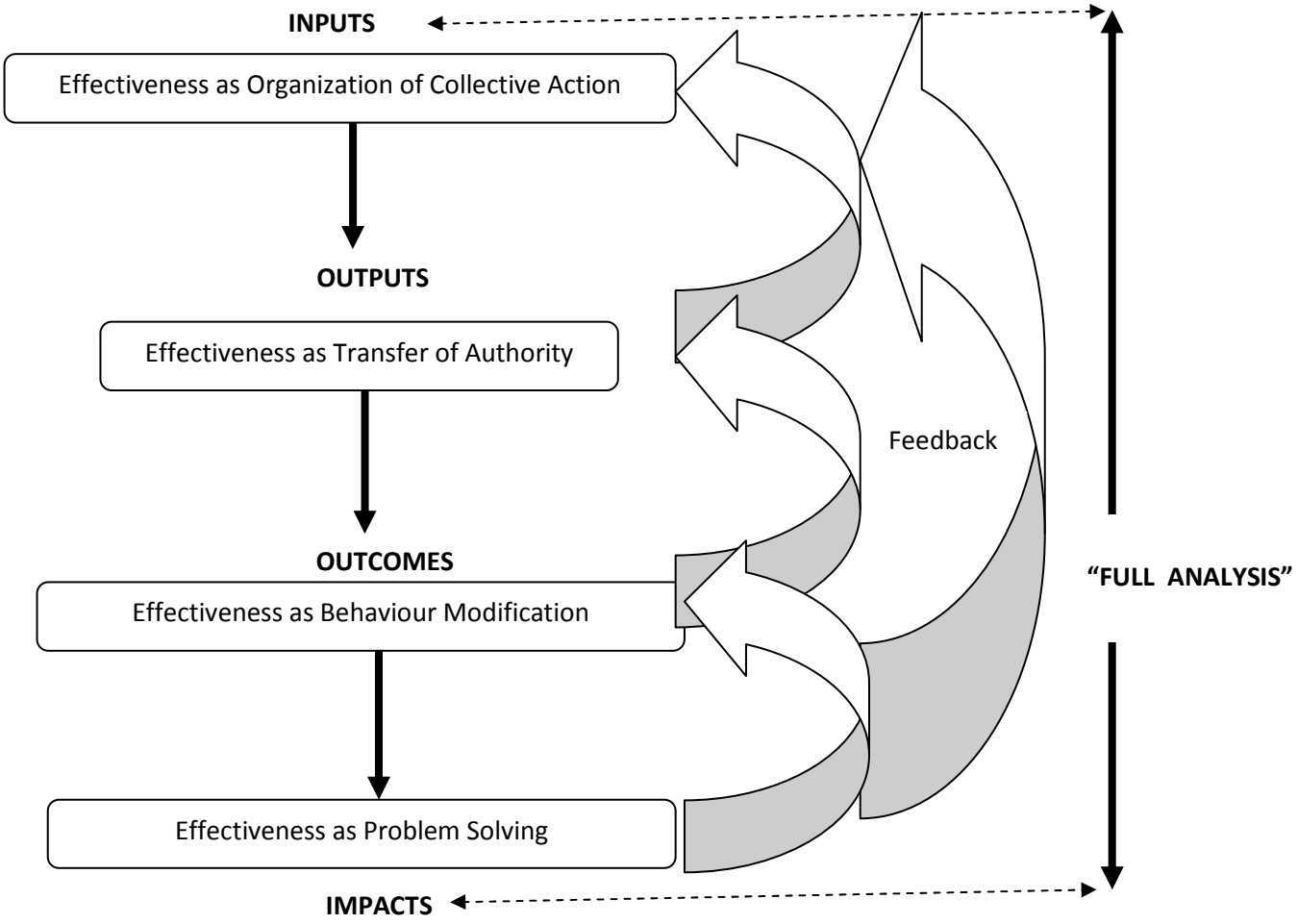


Figure 1.1 The Regime Analytical Level Process (RALP) Model

Conceptualizing transboundary water regime effectiveness analysis: a partial approach

According to Rittberger (1999: 21), the ability to analyze behaviour change and problem-solving of international regimes come as a result of "interactive effects of various regime consequences that take long time to generate behaviour change or ultimate problem-solving". According to Hejny (2008) international regimes as dynamic processes constantly produce outcomes in their lifetime. This makes cross-sectional regime effectiveness analysis necessarily 'partial'.

Stokke (2007: 6) asserts that, regime effectiveness analysis based on the problem solving criterion poses four challenges. Firstly, operational problem solving requires causal examination of how implementation of the regime outputs and domestic legislation affects relevant actors (*Ibid*). This requires evaluation of factors that produce changes to problem solving. This further requires a method of analysis that will provide meaningful comparison with other regimes (*Ibid*). To substantiate a causal relationship between a regime and relevant behavioural adaptations, one has to identify appropriate causal mechanisms (*Ibid*).

Secondly, Underdal (2002:436) argued that, regime effectiveness increases with maturity of regimes. A full regime analysis means a long-term study or is possible only when the regime is over. As such, all analyses of effectiveness done midway are partial. Stokke (2007: 8) asserted that, there is no limit to behaviour change and it can at one time be positive or negative, therefore behaviour change is dynamic. This means regime effectiveness analysis take a partial view through 'snap-shot' case studies.

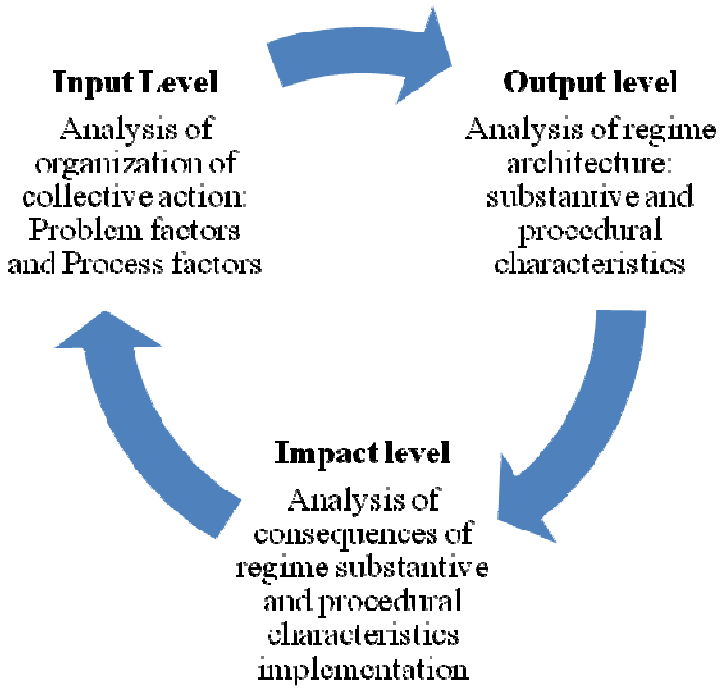
Thirdly Stokke observed that, regimes are implemented through donor-led programmes. This means that evaluation of regimes activities will unfold according to various programme phases. As such, regime effectiveness analysis becomes temporally partial, i.e. split into implementation phases, and spatially partial i.e. by considering aspects of piloting or early and late project areas.

Lastly, the RALP model partial analysis refers to a situation where regime effectiveness analysis is a choice at all levels. For example, evaluation can be done for inputs (collective

action level); outputs (regime architecture level); outcomes (behaviour change); or impacts (problem solving). The analyses give indication of the effectiveness of each regime level. Partial analysis helps to inform prescriptive measures or reforms and can also strategically help to manage resources or inform specific analyses.

This study considers a partial effectiveness analysis of transboundary water regime in the Lake Victoria Basin. This regime is still in its early stages (phase one concluded in 2002, and phase two started in 2008). To determine the effectiveness of this regime, three levels are chosen for analysis, namely: *inputs, outputs* and *impacts*. The combined analysis of these three levels informs the effectiveness of the whole regime. This partial analysis is justified by the period of study and available resources. A cross-sectional exploratory study is employed to analyze the partial effectiveness of the transboundary water regime at the Lake Victoria Basin, East Africa. Figure 1.2 illustrates the flow of this analysis.

Figure 1.2 A 'partial' regime effectiveness analysis (inputs, outputs and impacts) for the Lake Victoria Basin.



Analyzing the regime's inputs

As observed earlier regime inputs are the factors that influence regime creation. The analysis of regime inputs involved identification of problem and process factors (Young and Osherenko 1999: 248-251). The primary emphasis is on understanding the forces at work, including those related to the problem (i.e. the problem factors) and process factors (power interest, ideas behind agenda setting, negotiations and signing of agreements) (see Breitmeier, Levy, Young and Zurn 1996).These are further explored in Chapter 2.

Analyzing the regime's outputs (or architecture)

This step involves identifying the regime's architecture or attributes. These attributes are divided into two categories, namely the substantive (principle regulatory) characteristics and procedural characteristics (the procedural and programmatic elements) normally making up the treaties, conventions, protocols, declarations, programmes, strategic action plans, and project objectives. The main substantive characteristics are the norms, principles, and rules while the main procedural characteristics are procedural principles, procedure, practice and organization (See chapter 2). Breitmeier and colleagues (1996) observe that regime analysts use data on regime architecture to assess the performance and evolution of regimes. "Policy-makers use such data to explore compliance mechanisms, programmatic activities, decision rules, dispute settlement procedures, or organizational arrangements, to design effective international institutions" (*Ibid*). Chapter 2 explore further these elements at further length.

Analyzing the regime's impacts

The impacts of regimes are the consequences that arise when the rules are implemented. Analyzing impacts involves identifying the regime substantive and procedural characteristics of regimes (see Chapters 2 and 5), and establishing whether they had impact on problem-solving (see Chapter 6). The regime and the various regime components are analyzed for their impacts towards attaining the goal of problem-solving. Problem-solving is defined as the capacity to establish programme of measures that prevent, inform, negotiate and repair transboundary water problem (Magraw 1986). Its impacts will be noticed through positive changes in bio-physical environment and improvement in social welfare. Impact analysis is therefore done by exploring the 'cause-and-effect' pathways of regime characteristics, disaggregated using the AHP methodology to track causation attributed or leveraged to problem solving (further explored in Chapters 3 and 6).

Bringing it all together

From the foregoing discussion, it is clear that effectiveness analysis evolves within and across different levels. As such, it generates information on processes and outcomes at each level. Evaluation of *inputs* involves identification of problem and process factors that drive the attention of international community to address a problem. Knowledge of problem and process factors should be sufficient for successful regime creation. Successful accomplishment of these activities is referred to as 'effectiveness as organization of collective action'. Such effectiveness should culminate in problem identification, conceptualization, and contextualization, including setting out of substantive and procedural characteristics (*outputs*) that address the problem. The successful adoption of substantive and procedural regime characteristics is important for effective regime. I refer to this as 'effectiveness as the transfer

of authority'. Effective transfer of authority should be seen not as just change in behaviour (outcomes) but a gradual process in activities leading to problem solving (*Impacts).* There should be a clear cause and effect indication at the impact effectiveness analysis. I refer to this as 'effectiveness as problem-solving'. This approach according to the RALP model involves an analysis of inputs: 'effectiveness as organization of collective-action', Outputs i.e. effectiveness as transfer of authority and, Impacts: effectiveness as problem-solving.

Regime effectiveness is determined from the adequacy of the sum of the three levels (Chapter 3). It evaluates whether the transboundary water regime creation process (inputs) addressed fundamental values of the people affected and how these values were built in the regime architecture (outputs) for transfer of authority to realize behaviour change or social order (outcomes), that promotes the goodness for human dignity (impact). The results can be used to prescribe reforms to regimes. However, such prescriptive analyses are rare in Sub-Saharan Africa where the majority of transboundary water regimes in Sub-Saharan Africa have been described as- "paper tigers" (Rangeley *et al.*1994). The following section briefly explores the effectiveness of transboundary water regimes in Africa.

The effectiveness of transboundary water regimes in Africa

In Africa, the majority of the population live in a situation of water scarcity. The UNEP (2006) indicates that, water levels for many of Africa's lakes have dropped drastically and the supply of clean drinking water is being endangered. These changes are attributed to combination of human activities and climate change.

Africa is a continent with many transboundary freshwater resources. It has 677 lakes, the highest of any continent (Nakayama 2003). There are about 80 international water basins in Africa; with about ten countries per basin and many basins per country e.g. Guinea (*Ibid*). The water challenges facing Africa can be put into two categories. First, those associated with water resource management, and secondly, those involving delivery of water services at different levels of society (*Ibid*). In terms of the former, countries regulate their relationships with regards to shared water resources through treaties, protocols, agreements and other legal instruments. These usually addresses issues such as water quality, water utilisation and abstraction, fisheries, the construction of hydraulic structures such as dams and weirs for irrigation, hydro-power generation and flood management, notification and conflict resolution. There are many transboundary freshwater regimes in the continent, but, few can be said to have been successful (Lautze *et al.* 2005).

A growing body of research indicates different factors have driven the development of transboundary water law in Africa during the post-colonial period (Lautze *et al.* 2005). Lautze and colleagues (2005) identify these factors in two distinct categories, namely: internal and external factors. Internally, these factors include joint management, water development, and water sharing and division. Externally, a range of factors include pre-existing cultural ties, the international environmental agenda, and rising global concern with water conflicts. However, there is an evolutionary change in the way these external factors influence transboundary water governance in Africa (*Ibid*). Lautze and others (2005) suggests that both internal and external drivers must be considered by basin states and outside actors in the analysis of transboundary water governance.

As such, they argued transboundary water governance in Africa has to deal with complex scenario including the following. First, transboundary water basins exhibit a long history of collaboration dating back to the colonial period (Lautze *et al.* 2005). Second, transboundary water resources serve many local and international interests, as well as riparian and hinterland relations. As such, the scope of environmental concerns of transboundary water resources in Africa is wide. Third, there are links between environmental management and economic, social, cultural, political and ecological considerations (ibid).

However, the lack of effective implementation of international regimes in African states has already been observed (Compagnon 2006). Rangaley *et al*. (1994) called transboundary water regimes in Africa as 'paper tigers'. According to Jackson (1990) and Compagnon (2006) the ineffectiveness relates to a wide range of factors that include the following. First, they identified African states as quasi-States, characteristerized by non-representative and non-accountable political structures. Secondly, are characterized by bad governance at national and sub-national levels, and lastly, have a set of cultural values alien to western political thought. Compagnon (2006) also observed that, there was lack of success to date in the numerous efforts made to reform the African states to make politicians more accountable to natural resources management. The use of conditionality by international donors generates claims from states that they violate their national sovereignty (*Ibid*). Compagnon (2006, 2007) argued that, the nation state structure and political elite's behaviour were crucial areas of analysis when trying to understand the interplay between global and local regimes of environmental management across spatial scales.

Apart from the above factors, there are other factors that make joint management of Africa transboundary lakes, particularly, complex (BICC 2007). For example, in the Eastern Africa Great Rift Valley transboundary lakes, namely: Lake Tanganyika, Lake Malawi and Lake Victoria, are threatened life sustaining ecosystems. According to Bugenyi and Balirwa (1998), these ecosystems are threatened as a result of policies that emphasize exploitation (development) rather than conservation. However, efforts to solve these problems remain wanting. This study therefore analyzes environmental regime effectiveness in one such area - the Lake Victoria basin, East Africa.

Regime effectiveness in Africa: the case of the Lake Victoria Basin,

The Lake Victoria is the source of River Nile, and largest freshwater fishery, and the second largest freshwater lake in the world. The threats to it include low levels (1 meter lower in 10 years), eutrophication, overexploitation of fisheries, introduced exotic species, and climate change (Kayombo and Jorgensen 2006:1). It is an important life sustaining resource supporting a population of about 30 million people with a density of about 1,200 people per square a kilometre around the lake (UNEP 2006).

The analysis for transboundary regime effectiveness in the Lake Victoria basin is significant for the following reasons. First, it has to operate within a complex and greatly under-studied context. The basin shares many of the characteristics identified above by Bugenyi and Balirwa (1998), Lautze *et al.* (2005), Compagnon (2006). Secondly, the basin is a member of the Eastern Africa Great Rift Valley transboundary lakes, with a long history of collaboration (Bugenyi and Balirwa 1998). Thirdly, it serves many local and international interests as well

as riparian and hinterland relations, as such, have a wider scope of transboundary water environmental concerns (Lautze *et al.* 2005). It links environmental management, economic, social, cultural, political, and ecological considerations among the East Africa Community member states and the wider international community. Also, the basin is the source of the River Nile and this widens the scope of environmental concerns of the basin from the three riparian countries- Kenya, Uganda and Tanzania to seven other member states of the Nile Basin.

Fourthly, the problem of poverty in the continent drives intervention to be in the form of development support. This underlines the significance of beliefs, values and norm identification in agenda setting for effective collective action in addressing important environmental issues of concern, including transboundary water governance. Many interventions are seen as projects from donors not as collective undertakings towards problem solving. A deeper analysis into how these interventions effectively address the problem they were intended to, is therefore imperative.

Fifthly, any water regime framework must work within the limitations imposed by inherent conditions, fit other economic and infrastructural devices, and often build on existing progress made (Lankford and Mwaravunda 2005). This is because setting a completely new regime may be severely restricted under the current scarce resources. This study therefore offers a stage-by-stage effectiveness analysis of transboundary environmental regime in the Lake Victoria Basin.

Lastly, the above characteristics make the Lake Victoria Basin theorerically and methodologically ideal case to explore the art and science of transboundary water regime effectiveness analysis outside the American and European contexts. Theoretically, it provides an ideal case to test international relations and international law theories under third party intervention mainly the North, thus imposing the need for hybridization of theoretical perspectives to explain power relations, norm diffusion, North-South relations, identities and norms in transboundary water management. Methodologically, it provides an ideal case to analyze cause-and-effect mechanism of transboundary water regimes dominated by donor agencies, thus calling for hybridization of methods for multi-criteria analysis. It also challenges ontological stand points of view, thus suggesting mergers or interplay of research paradigms. While this research takes a preliminary pre-testing nature of the RALP model approach to transboundary water regime effectiveness analysis, the generalizability of such within-case analysis for regime effectiveness analysis is explored in Chapter 3 and 8.

The aim and objectives of this study

The broad aim of this thesis is to describe, analyze and evaluate the presence of transboundary environmental regime in the Lake Victoria Basin. Underlying it, is an attempt to establish how this regime was created and how effectively it addresses the environmental problems it was originally meant to solve. To attain this aim, this study addresses the following questions:

1. How was the transboundary environmental regime in the Lake Victoria Basin created? (i.e. regime *inputs*)

2. What is the architecture of the resulting regime? (i.e. regime *outputs*)

3. What are the impacts of the regime as produced by the Lake Victoria Environmental Management Programme, Phase 1 (LVEMP 1)? (i.e. regime *impacts*)

4. How effective has the regime been **(**i.e. ***regime effectiveness)***, and what policy and law recommendations can be made to improve the governance of the Lake Victoria Basin?

With respect to Question 1, this thesis will identify the inputs that led to the creation of the regime and why such inputs came into place (i.e. drivers). These will shed light on what kind of environmental governance system currently exists in the Lake Victoria basin. There are problem factors and process factors that influenced the creation of transboundary environmental regime in the basin. Through interviews and documentary analysis, the relationship between these factors will be analyzed. The results are reported in Chapter 4.

With respect to Question 2, the agreement: Agreement for the Preparation of Tripartite Environmental Management Programme (APTEMAP), the East Africa (EA)Treaty and the Lake Victoria (LV) Protocol from the basis of the analysis of the regime's characteristics. A number of international water/environmental conventions, protocols, treaties, and also including organizational or programme goals in the Lake Victoria basin will be explored as probably influencing transboundary environmental governance in the basin. Their substantive and procedural principles, norms and rules, including those of functional organizations or programmes, will be analyzed primarily through documentary analysis. These mechanisms form the basis for transfer of authority for transboundary environmental management

practices in the basin. They shed light on the effectiveness of international environmental governance system in the Lake Victoria Basin. The findings are presented in Chapter 5.

With respect to Question 3, the impact of activities at the input and output levels are investigated to reveal how well the regime contributed to environmental problem solving in the basin. However, the basin is faced with not one but many inter-linked problems as Yohannes (2008: 101-144), including shrinking cultivable land and overpopulation, overfishing, pollution from industrial development, relative food insecurity and energy independence, corruption, massive deforestation and climate change. Here causal mechanisms and causal importance of the regime substantive rules and procedural rules identified in Chapter 5 will be analyzed in terms of how they produced changes in biophysical environment and social wellbeing (the impacts). As a result, the impact of transboundary environmental management system in the basin is determined to attain an understanding on how it addresses the problem it was intended to. The underlying methodological approach is explored in Chapter 3 and the findings elaborated in Chapter 6.

Finally regarding to Question 4, findings from the above three questions will give a summary of the state of transboundary environmental regime in the basin. Chapter 7 is an analysis of regime effectiveness in the basin by drawing on the results of Chapters 4, 5, and 6. The concluding Chapter (8) offers a discussion and theoretical reflection on the findings of regime effectiveness and suggestions for reforms to transboundary environmental governance in the basin.

The analysis is based on the neoliberal institutionalism theory or the legal process theory in international law. It recognizes the importance of law in promoting international cooperation.

The legal process theory explicitly recognizes the importance of policy in creating the conditions whereby law can serve humanity (Armstrong *et al.* 2007: 83). A neoliberal institutionalism analysis of transboundary water regimes effectiveness highlights the normative imperatives and multitude of actors involved in transboundary water governance (*Ibid*). Neoliberal institutionalists have an optimistic view of human nature where harmony and not war is that natural state of affairs. It recognises the primacy of the state and treats states as rational actors politically organized and recognizes the role of transnational actors (*Ibid: 86*). Armstrong and associates (2007: 87) identified the following three core neoliberal institutionalism principles:

> "First, states are not the only or even main actors in world politics. Liberals take a 'bottom-up' view of politics and emphasize the role of individuals and groups in domestic and transnational civil society. Second, the internal make up of states does not matter to how they act externally. In this sense states are not rational actors but vehicle for preference advancement by domestic constituencies. Third, states can form interdependent ties, through trade and institutionalized co-operation, which in turn can shape state preferences and policy."

However there are other theoretical interpretations that could be made to deepen our understanding of regime effectiveness. The following section gives an account on how different theoretical perspectives can be used to explain transboundary water regimes effectiveness in the study context.

Different theoretical perspectives on transboundary water regime effectiveness analysis

The theoretical foundation of this regime effectiveness analysis approach is neoliberalism. A mono-theoretical approach to transboundary water regime effectiveness analysis arguably cannot adequately explain the mechanisms and causal chains involved especially in a rather complex Africa situation (see Klaphake and Scheumann 2006). This section therefore identifies what other potential theoretical perspectives exist. According to Hasenclever *et al.* (1997) international relations is characterized by intense theoretical debates, regarding definitions interpretive frameworks and paradigms. There are also important methodological differences that few researchers have tried to bridge (Young, 2005). Three other theories could be relevant to the analysis, namely: realism, constructivism and structuralism. They are briefly explored here and further in Chapters 2 and 8.

Realism

Whereas liberal institutionalists see institutions as products of processes of bargaining or negotiation, realists point to the role of power and dismiss institutions as mere epiphenomena (Strange 1983; Mearsheimer 1994). Realists share the belief that states are primarily motivated by the desire for power or security rather than ideals or ethics (Hasenclever *et al.* 1997; Abbot 2006; Armstrong *et al.* 2007). Realism is based on the following key assumptions: the international system is anarchic; there is no authority above states capable of regulating state interactions; and states must therefore arrive at their own relations (Hasenclever *et al.* 1997).

Realists argue that the presence of a strong hegemon is what makes a regime successful (Hasenclever *et al.* 1997). Regimes simply reflect the distribution of power in the international system. Powerful states create regimes to serve their economic and security interests (Abbott 2006:13). Regimes have no independent power over states, particularly great powers (Hasenclever *et al.* 1997).

Constructivism

Constructivism focuses on the role of ideas and discourse as the substrate on which institutions rest (Hasenclever *et al.* 1997). Constructivists view all our knowledge as socially constructed. It contends that categories of knowledge and reality are actively constructed by social relationships and interactions. These interactions alter the way in which scientific episteme is organized. Constructivists analyze international relations by looking at the goals, threats, fears, cultures, identities and other elements of social reality on the international stage as the social constructs of the actors. It gives a structural account of the world with a difference contrary to realism, which conceives of structures in material terms. Constructivist view of international law or regimes is that they not only provide modes of cooperation and legitimization, but discursive resources for states to engage in argumentation (Armstrong *et al.* 2007: 289). This helps to foster learning and internalization of new norms. It is the application of constructivist epistemology that is useful in the effectiveness analysis of transboundary water regimes.

Structuralism

The common theoretical background behind structuralism is based dependency theory: the world economy developed in a way suggesting that inequalities are not only integral to its operation and but are self producing (Parks and Roberts 2006). This structures the global world economy into core and periphery, with an ongoing geopolitical conflict over international environmental politics as well as structuring of certain types of environmental degradation by such global inequalities e.g. deforestation and biodiversity loss.

Whereas the above theoretical lenses emphasize the decision-making capacity of actors to determine outcomes, structuralism emphasize the mediating and constraining role of institutional setting within which outcomes are to be realised (Hay 2002: 105). Hence, "it draws attention to the intersubjective nature of structure and the role of agents (actors) in the constitution of the very contexts within which their political conduct occurs and acquires significance" (Hay 2002: 106). The structuralism epistemology that is useful for the effectiveness analysis of transboundary water regimes is its ability to offer explanations of three core analytical components not addressed by the other theoretical lenses, namely, context, structure and agency (Hay 2002).

Some epistemological and ontological perspectives: positivism and postpositivism, have already taken a middle ground between these major theoretical perspectives. Others disagreeing with positivist approaches have sought hermeneutics or phenomenology, as suitable approaches to the study of international regimes (*Ibid*).

Conclusions

This chapter has shown the need to shift attention from the obvious claim that water is life to how well it can be governed as an essential resourse. It argued that the struggle to limit negative impacts of water related hazards and deficiencies is being lost in many countries and particularly in transboundary water basins, raising many questions about the problem solving capacity of current water governance systems.

The chapter identified part of the problem as due to lack of clear understanding of the concept of water governance. As such, the chapter defined water governance under five categories, namely: Water governance as inputs, outputs, outcomes, impacts and as effectiveness. Through these categories water governance was also identified as multi-functional, multi-layered, and multi-faceted. The chapter also argued that, whereas water governance in history has been considered under the concept of regimes. The definition of transboundary water regime remained a challenge and has sparsely been defined. As such, the analysis of transboundary water regimes has proceeded under limited conceptualization leading to studies being descriptive than prescriptive, focused on identification of key drivers, incentive structures and constraints; explore hydro-hegemon and hegemonic stability theory; based on internatonal relations and international organization theories. Studies have also considered risks of serious water conflicts and the influence of colonial agreements.

The chapter stipulated this thesis approach to effectiveness analysis of transboundary water regimes by considering international relations and international law theories. It has drawn from the New Heaven School and the World Order Model of international law premised on

the understanding that water is life and the purpose of global water governance should be patterned according to world public order that advances fundamental values and legal process. Such analysis would involve multi-criteria analysis to show cause-and-effect mechanisms of management interventions as proposed by transboundary water regimes and how these impact human dignity.

By considering a case study in Africa, the chapter has shown how the continent is rich in transboundary water basins, heavily affected by environmental degradation, and under complex and sparsely studied context. This chapter identified that: transboundary water governance in Africa exhibits long history of collaboration; transboundary water resources serve many local and international interests as well as riparian and hinterland relations; their scope of environmental concern is therefore wide; and these resources link many environmental, economic, social, cultural, political and ecological considerations.

However, the chapter also identifies the lack of effective implementation of transboundary water regimes in the continent. It identified the main reasons as: many Africa states are quasi-statea with non-representative and non-accountable political structures; their is wide spread bad governance at national and subnational levels; exihibit set of cultural values alien to western political thought; and lastly, claims of donor conditionality violating national interests. The chapter introduces this thesis by considering a case study of the Lake Victoria basin, East Africa. It is a lake basin context that is complex and sparsely studied for transboundary water regime effectiveness analysis. It shares the above stated characteristics with many transboundary water basins in the continent, and the rest of the world (particularly

the Great Lakes of Canada and USA). As such, the basin presents a good case for theoretical and methodological analysis.

This chapter explored the concept of transboundary water governance and proposed a multi-level approach to transboundary water regime effectiveness analysis. By employing this approach, this study will analyze the effectiveness of the transboundary environmental regime in the Lake Victoria Basin. This chapter argued that effectiveness can be studied using a RALP model through which, analyses can be undertaken from many theoretical vantage points than offered by neoliberal institutionalism. Other theoretical lenses, namely: realism, constructivism and structuralism, can potentially improve understanding of the effectiveness of transboundary water regimes.

The rest of this thesis analyzes transboundary water regime effectiveness by exploring the adequacy of regime creation (inputs), regime architecture (outputs), regime outcomes (behavioural change), and regime impacts (problem solving) from a multi-theoretical perspective. It does so in order, hopefully, to derive a number of reforms to improve the problem solving capacity of water management regimes in general and that centred on the Lake Victoria Basin in Particular. Chapter 2 starts this process by establishing the key theoretical foundations of the analysis.

Chapter Two

CHAPTER 2

Effectiveness Analysis of Transboundary Water Regimes: a theoretical review

Introduction

Chapter 1 highlighted the need to rethink the problem-solving capacity of transboundary water governance as water is the only scarce resource for which there is no substitute, over which there is poorly developed international law, and the need is overwhelming, constant and immediate (Wolf 1997: 334). It also highlighted how the regime approach to transboundary water governance can be prescriptive. This chapter explore the literature on how the regime approach can be instrumental and prescriptive to transboundary water management through regime effectiveness analysis.

The rest of this chapter unfolds as follows; Section 2 reviews the evolution of the concept of international regime while Section 3 sketches the emerging focus of interest in international regime analysis as international regime effectiveness. Section 4 explores the state of the art of international regime effectiveness analysis. Section 5 explores inputs or the concept international regime creation. Section 6 outputs, is a review of regime characteristics namely, norms, principles and rules. Section 7 reviews the regime impacts (impacts) and how they could be understood on the wider transboundary water regimes. Section 8 is a general review on regime effectiveness and regime effectiveness analysis. Section 9 brings together how this hierarchy form an essential tool for regime effectiveness analysis. Section 10 explores alternative theories to regime effectiveness analysis for the purpose of validating the study, while Section 11 draws this chapter conclusion. The following section explores the international regime concept.

The evolution of the concept of transboundary water regime

The concept of transboundary regimes, as understood from international regime theory, originated as a way of transboundary cooperation: a co-ordinated mutual adjustment of states' policies to create a transboundary regime with accrued benefits to actors (Keohane 1999: 23). The definition of regime has been variously debated by different scholars (Bull 1977; Strange 1983; Haggard and Simmons 1987: 493; Keohane 1999: 24; Young 1973; Turton *et al.* 2003; Stoke 2007). Equally, that of transboundary water regime can be said to be contentious (e.g. Haftedorn 2000; Lindemann 2006; Dombrowsky 2006; Furlong 2006). Before exploring the concept of transboundary water regime, I explore the definition of the regime concept and its significance to the analysis of transboundary water regime effectiveness.

The term regime was first used by Young (1973) to describe a system of governing arrangements for a given social structure or region (Gupta *et al*. 1993). Later Krasner (1982: 186; 1983: 2) provided what became the conventional definition of regime. The most commonly used definition of international regime, as noted in Chapter 1, is that of Krasner (1983:1). He defines international regimes as:

> "implicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given area of international relations. Principles are beliefs of fact, causation, and rectitude. Norms are standards of behaviour defined in terms of rights and obligations. Rules are specific prescriptions or proscriptions for action. Decision making procedures are prevailing practices for making and implementing collective choice."

However, the above definition has been contested by various authors (Haggard and Simmons 1987: 493; Stokke 2007). Firstly, the distinction between the three key components of the definition: norms, principles and rules. Stokke (2007) argued that, such disaggregation makes rules the most specific of the three components and does not correspond with common usage of a rule in international law. A rule primarily denotes bindingness (*Ibid*).

Bull (1977: 54) observed that, if regimes are rules, they are general imperative principles which require or authorize prescribed classes of persons or groups to behave in prescribed ways. According to Krasner (1982: 2), institutions are important in securing adherence to rules through formulating, communicating, administering, enforcing, interpreting, legitimating, and ensuring adaptation to them. As such, when implemented by institutions, rules play an important role in the international society (*Ibid*). Stokke (2007) argued that, when regimes are contextualized as rules it undermines the significant role of norms and principles in regime analysis.

Secondly Stokke (2007) observed that, the concept of regime is too inclusive. For example, Keohane and Nye (1973) referred to regimes as sets of formal and informal governing arrangements that include *networks* of rules, norms, and procedures that regularize behaviour and control effects. Young (1989: 32) defined regimes as social practices consisting of easily recognised roles coupled with cluster of rules or conventions governing relations among occupants of those roles. Keohane (1989: 4) defined regimes as institutions with explicit rules agreed upon by governments that pertain to particular set of issues in international relations.

Thirdly, regimes are formal and informal institutions. According to Vogler (2000: 21), regime is an institution that would comprehend the legal rules and some type of formal and informal organization. He argued that, it is not easy to locate informal components as the attempt to provide governance frequently involves the active construction of legal framework rather than the slow accretion of practice (*Ibid*).

These conceptualizations ignore the intersubjective and communicative nature of regimes articulated in the Krasner's conventional definition' (Stokke 2007). They reduce the components of norms, rules and decision-making procedures into single component, rules. Hasenclever *et al*. (1996: 180) observed such a conceptual reduction discourages the analytical contextualization of international regimes. However, Strange (1983) asserts the concept of regime is 'woolly and imprecise', and the definition one adopts depends on the context of study. As such, Ruggie (1975) suggested that:

> "studies in international regime analysis are well positioned to grasp their context if they employ 'zoom-in' approach to the concept of regime to encompass implicit understandings and mechanisms between the whole range of actors, including non-state actors involved and their effects".

Many schools of thought in international regime analysis share the Krasner's conventional definition of the concept of international regime (Jansson and Tallberge 2006). When applied to the water relations within transboundary or international systems, this regime conceptualization appears to be relevant in the analysis of water governance systems (DuPlessis 2000: 20-21). However, few studies define transboundary water regimes

according to ‘zoom-in approach’ to encompass implicit understandings and mechanisms between the whole of actors and their interests.

According to Haftendorn (2000: 65) “[a] water regime exists when the affected states observe a set of rules designed to reduce the conflict potential, caused by the use, pollution or division of a given water resource; or the reduction of the standing costs; and the observance over time of these rules”. He narrowly defines regimes as rules of conflict resolution caused by pollution or division of a given water resource. According to Bull this definition considers transboundary water regime as general imperative principles that authorizes prescribed activities (those related to pollution) and people (those related to their rights of access and use), to behave in a prescribed way. The definition fails to recognize the multi-functional and interconnective role of water, for example as in the hydrological cycle.

Lindemann (2006) referred to transboundary water regime as “norm and rule based cooperation for the political resolution of problems and conflicts in the field of transboundary water basin management”. He goes a step further to recognize transboundary water regimes as norms. However, to refer transboundary water regimes as ‘norm and rule based cooperation for political resolution of problems and conflicts in the field of transboundary water basin management’ makes regimes to be standards and/or procedures prescribed for political resolution of conflicts and problems. The ‘substance’ behind or guiding these procedures and standards seem to be lacking. In fact norm and rule based international water cooperation is much more wide spread in Africa than is usually assumed in the international discourse on water cooperation (Dombrowsky and Grey 2000).

According to Marty (2001), water regimes are explicit or implicit, formal or informal principles, norms, rules and procedures shaping the cooperation of riparian states involved. This definition does not consider the interdependences and inter-catchment stakeholder relations involves in transboundary water. Its conceptualization is based on river basins where the only affected members are riparian states. Such conceptualization led to Rwanda and Burundi to be left-out during the initial negotiations for creating the Lake Victoria regime, because they are not riparian.

Many transboundary water basins are dominated by cooperation of basin states that leads to signing agreements without 'substance' of commitment (Rangeley *et al.* 1994). As such, moral values or the principles of rectitude (goodness) that establish the 'duty of care' are not recognized. This reduces transboundary water regimes to mere procedures of conflict resolution and problem solving.

Turton *et al*. (2003) observed that, the current regime approach (based on Krasner's definition) has limitations from the definition to its application. He asserted that:

> "it concentrate on what has been agreed upon at the cost of what has not been achieved, overemphasizes the static and not the dynamic . It is conservative with value bias, and it is both state and technocentric. It reflects the rules and norms rather than power and interests, does not take into account the domestic circumstances that led to adoption of certain decisions and lastly and tends to be too issue-specific".

According to Vogler (2000: 22):

> "the concept of regimes dwells so much on order at the expense of questions of justice. To do regime analysis is to assume that institutions play a significant role in shaping actors' behaviour. It assumes the problem is not maintenance of order, and there is an inherent risk in emphasizing order in international cooperation without reference to any effectiveness criteria".

It is from this background that I refer to transboundary water regimes as:

> explicit and implicit principles, norms, rules and decision-making procedures around which actors' expectations for rectitude converge in governing transboundary water and its related resources. It should be able to steer a hierarchy of interdependences between the various contexts, interests and levels of transboundary water governance between governments, citizen preferences, political interests, the structure and management of organizations, and the core focus of public agencies. As such, it must link contexts, values and interests of governments, citizens, policymakers, organizations, and other stakeholders in a dynamic process.

This definition addresses the core focus of transboundary water regime to be an establishment of an ethic of 'duty of care' among stakeholders' contexts, interests, and values, across all levels of transboundary water basin or international water management. When this 'substance' is established, conflict among competing interests and values is reduced. This definition is linked to the first two of the Dublin Principles 1992, which state that:

"Effective management of water resources requires a holistic approach, liking social and economic development to environmental and land use concerns, including inter-watershed issues". "The participation of all stakeholders, planners and policy makes at all levels is absolutely necessary". (*cf.* Phillips *et al.* 2006: 23).

The emerging focus of interests in transboundary water regime Analysis

There is growing interest in the analysis of transboundary water regimes, just as in the use of the regime approach to analyze governance systems. There is increasing environmental degradation in many transboundary water basin and the effects of transboundary water regime remain scanty (Furlong 2006; Dombrowsky 2008; Haftedorn 2000; duPlessis 2000; Rangaley *et al*. 1994). Rangeley *et al*. (1994) claims that, many international water treaties in Africa remain 'paper tigers'. In Africa the main focus of water regimes is on allocation and conflicting uses of international water (Turton and Solomon 2000). Klaphake and Scheumann (2006) quoted some success of general water regimes in Africa in establishment of basic principles for transboundary water management and related resources. They referred this to the Water protocol of the Southern African Development Community (SADC). However, the broad water resources degradation in the continent makes the effectiveness of many water regimes in the continent questionable.

The relevancy of transboundary water regimes is their concern with specific issues: social, economic and ecological, that is why states create and subscribe voluntarily as a means of self-regulation in the international arena (Mayer, Rittbeger & Zurn 1993: 393). Keohane (1999) asserted that:

> "international regimes are useful to governments. Far from being threats to governments, they permit governments to attain objectives that would otherwise be unattainable. Regimes facilitate agreements by raising the anticipated costs of violating others' property rights, by altering transaction costs through clustering of issues, and by providing reliable information to members. Regimes are relatively efficient institutions, compared with alternative of having a myriad of unrelated agreements, since their principles, rules and institutions create linkages among issues that give actors incentives to reach mutually beneficial agreements. They thrive in situations where states have common as well as conflicting interests."

As such, transboundary water regimes are useful to governments and other actors in managing the multifunctional roles served by transboundary water in the various contexts of social and ecological wellbeing. The regime approach is still relevant especially with substantial studies on actual processes and mechanisms of governance (Stokke 2007). In the recent past, regime analysts have been concerned with the consequences and outcomes of international institutions and the problem of effectiveness (Haas *et* al., 1993; Gupta *et al.* 1993; Underdal 1994; Victor *et al.*1998; Helm and Sprinz, 2001; Miles *et al.* 2002; Turton *et al.* 2003; Young and Levy, 2004). Turton *et al.* (2003) found the regime approach useful in breaking down, describing and comparing the component parts of institutions. Also, by using the regime approach, Gupta *et al.* (1993) studied actual processes and mechanisms of governance. Young (1994) and Vogler (2000: 23) emphasized the analytical values of regimes in understanding governance arrangements. They asserted that:

> regimes are malleable and can be utilized and adapted to analyze governance arrangements in the international society. Regimes govern specific issue areas and this distinguishes them from broad international orders that extend over wide range of specific areas. International regimes as defined in terms of specific issue area: are more specialized arrangements that pertain to well defined activities, resources or geographical areas and often involve only some subsets of the members of the international society (*Ibid*). Regime characteristics (i.e. norms, principles, and rules) vary according to the type of specific issue.

Keohane (1999: 23) noted that, international politics or most forms of systematic organized co-operations are extensive, horizontally organized, with few rules hierarchically enforced. They exist as embedded multi-layered systems with nested arrangements in comprehensive set of agreed-upon rules (*Ibid*). Understanding the context and mechanisms of these systems of rules is therefore essential if we are to improve effects if international cooperation to solving specific issues. Regime analysis should therefore involve unfolding the complex of the dynamic systematic hierarchical processes to problem solving (*Ibid*). The regime definition by Krasner therefore allows regime analysts to explore the relationship among the various components of norms, principles, rules and decision-making procedures (Zacher 1987: 175-177; Kohler-Koch 1989b. Sec 3; Hasenclever *et al.* 1996: 180). Such analysis was found to guide empirical studies (Kohler-Koch 1989a; Rittberger 1990b; Zurn 1992: Ch.3; Muller 1993a; Schrogl 1993; Zacher and Sutton 1996: 14 and Hasenclever *et al.* 1996: 180).

Exploring the state of the art in international regime effectiveness analysis

Whereas the regime approach was found useful as indicated in previous section, a number of analytical weaknesses have been identified in the current regime approach (Haggard and Simons 1987; Tooze 1990; Milner 1992; Underdal 1995; Stokke 1997; and Vogler 2000). Before turning to these weaknesses, I seek to understand effectiveness as applied to the operations of institutions. According to the Business Dictionary (2010), effectiveness is defined as:

> "the degree to which objectives are achieved and the extent to which target problems are resolved. In contrast to efficiency, effectiveness is determined without reference to costs and where efficiency means "doing the thing right, "effectiveness means "doing the right thing" (Business Dictionary 2010)[3] .

The degree something addresses the issue it was meant to address needs to be contextualization depending on the underlying objective of the measurement. A regime is effective if it solves the problems it addresses (Haas *et al.* 1993; Young and Levy 1999). However, three types of contextualization of the degree of addressing an issue of concern can be identified, namely: effectiveness evaluation, effectiveness assessment, and effectiveness analysis.

Effectiveness evaluation refers to how operations account for degree of addressing intended problems. In contextualizing regime effectiveness evaluation, Young (1992: 163) observed that:

[3] www.businessdictionary.com/definition

> "Institutions figure as components of causal clusters whose individual elements are hard to disentangle. As such the effectiveness of international institutions can be measured in terms of their success in the area of implementation, compliance and persistence. This is a matter of degree rather than all or nothing proposition".

Effectiveness evaluation investigates whether intended goals or targets have been met. It determines whether the goals of the regime have been met (e.g. Underdal 1992). Rangaley *et al.* (1994) studied the effectiveness of water treaties in Africa. In effectiveness evaluation studies the major concern is in goals and their outcomes. The processes and mechanisms involved do not form part of the analysis. Effectiveness evaluation studies may not be prescriptive but may give some recommendation from their findings.

Effectiveness assessment relates to the degree to which some set standards or limits have been attained. In transboundary water, this could be whether certain water quality targets have been met or compliance levels attained (Dombrowsky 2008: 224). Its concern is on outputs and their impacts, but not how the outputs are arrived at or how the impacts would affect inputs and outputs. Such studies are more functionally based on compliance or maintenance of standards. The question is whether causal links exists between transboundary water regimes (outputs) and their respective impacts or outcomes (Dombrowsky 2008: 225).

Effectiveness analysis relates to the investigation of the relative importance of each factor or components in determining the degree of addressing set goals. For example Klaphake and Scheumann (2006) observed that, both the "formation of water regime and their effectiveness

are two analytically distinguishable but interrelated aspects". Effectiveness analysis therefore involves interpretive epistemology (Young 1992; Kratochwill and Ruggie 1986).

Regime analysis involves investigation of distribution of power, prevailing systems of ideas, and how interest of individual parties influence international behaviour. Kratochwill and Ruggie (1986) observed that, the use of deductive models in regime analysis offers poorness of fit between the expectations such models predict, and observable behaviour at the international level. They also observed that, conventional inductive procedures are limited by the small number of typical international cases. They suggested that effectiveness analysis studies must investigate multivariate relations (*Ibid*).

However, studies in effectiveness analysis of international or transboundary water regimes as defined above remain rare (Bernauer 2000). Dombrowsky (2008) observed that, a study by Rangeley *et al.* (1994) claimed that, many international water treaties in Africa remained 'paper tigers', however the evidence of such assertions remains at an anecdotal level. There are some effectiveness evaluation studies that point to the obstacles faced in implementing the water-related provisions, such as the Israel-Jordanian Peace Treaty 1994 or the 1995 Oslo B Agreement between Israelis and Palestinians (Edig 2001; Dombrowsky 2003; Fischerhendler 2007). Fischerhendler *et al.* (2004) observed implementation difficulties in the Boundary Water Treaty 1944, concluded between Mexico and the United States, amongst many other studies. However, these studies serve as examples of transboundary water regimes effectiveness evaluations.

Other water regime effectiveness studies include, the 1987 Rhine Action Programme of the International Commission for the Protection of the Rhine (ICPR), normally hailed for its success story of international river cooperation (see Durth 1996; Bernauer and Moser 1996; Gurtner-Zimmermann 1998; Holtrup 1999; Verweij 2000). A number of factors have been considered drivers for the perceived success. Dombrowsky (2008: 224) identified the following factors as significant:

> "a joint vision, a phased approach with achievable targets; technical dialogue among those responsible for implementation; implementation at the national level; monitoring through publication of national reports; admission of NGOs; a small secretariat; and non-binding character of the action of programme (e.g. Holtrup 1999)".

Dombrowsky (2008: 224) points to how these studies were actually effectiveness evaluation. He argues the relationship between institutional design and outcomes is not very clear. He observed that:

> "Bernauer and Moser (1996) point the success can be attributed to independent activities at national level. Gunther-Zimmermann (1998), who explicitly studied the effectiveness of the Rhine Action Program, did not relate the outcomes to the institutional set-up. Holtrup (1999) on the other hand did not establish the causal relationship between institutional design and regime outcomes. This indicates that further research on the relationship between institutional design and regime effectiveness is warranted, not only for the Rhine but also beyond this river basin"

In his study, Dombrowsky (2008) analyzed the relationship between institutional design and regime effectiveness of the International Commission for the Protection of the Elbe, drawing from the success story of the Rhine model by Holtrup (1999). This was before substantive implementation of the European Union Water Framework Directive (WDF) in the Elbe Basin. His application of regime effectiveness analysis based on the Oslo-Potsdam solution was based on Actual performance (AC), the Collective optimum (CO) and non-regime counterfactual (CO) (see Dombrowsky 2008: 225). This approach does not establish how generic elements or inputs of the regime addressed the intended problem. Also, the assumption that collective optimum refers to goals set by actors fails to consider that, goals shift depending on circumstances. As such, their substantive relevancy of goals is dynamic. Goals are as good as procedural characteristics and cannot define standards of behaviour, but programmatic arrangements dictated by prevailing circumstances.

Also participants based their assessments of goals on different reference points as different activities were carried out in different areas. This was also the case in scoring achievements of objectives, which were used to rated actual performance. The question of adequacy in addressing the water quality problem in the basin was not addressed. Basing regime effectiveness on non-regime counterfactual does not reflect the definition and target of regime effectiveness analysis. The adequacy of actual performance in addressing intended targets seem questionable. This kind of study is therefore an example of effectiveness assessment.

This study, as stipulated earlier, employs Analytical Hierarchy Process (AHP) methodology to decompose regime into its analytic levels and generic elements, synthesize cause-and-

effect mechanisms, and analyze regime effectiveness (see Chs.1&3). The following sections review the major levels of effectiveness analysis in transboundary water regimes as identified in the RALP model, namely: regime inputs, outputs and impacts (Chapter 1).

Transboundary water regime creation (regime inputs)

The creation of environmental regulations at the international level requires cooperation which is a difficult "collective action" problem (Bernauer 2000). International regime creation "is the process by which regimes come into being in an issue area where none existed before" (Klaphake and Scheumann 2006). It involves initiation of the regime through international problem identification and negotiations leading to international agreements (*Ibid*). Successful regime formation is the conclusion of legally binding international accord that involves clearly defined goals and policy commitments that enters into force (Bernauer 2000). The creation of multilateral institutions is influenced by large host of political, economic, social, and cultural factors (*Ibid*). Thinking about collective action requires a framework within which to understand why countries might or might not collaborate in particular reforms, and also actions and processes that favor greater collaboration (Messner *et al.* 2005).

According to Haftendorn (2000: 65) suggested that:

> "[a] water regime exists when the affected states observe a set of rules designed to reduce the conflict potential, caused by the use, pollution or division of a given water resource; or the reduction of the standing costs; and the observance over time of these rules".

At the transboundary water basin level, the organization of collective action, defined as group mobilization of member countries towards one goal (UN 2005), or cooperation for managing shared resources and their environments has been considered an important matter to save these scarce resources (Dinar *et al.* 2006). At the same time, this has been considered a key area in global sustainable development, without which water conflicts at the global scale would be inevitable (*Ibid*).

Various disciplinary approaches have been employed to understand the organization of collective action for international regime creation in transboundary water management. Economics has mainly been employed to under the concepts of regional cooperation, game theory and institutional economics. International water law has considered the aspect of collective action in transboundary water basins under its principle of *equitable utilization* and *the obligation not to cause significant harm* rule (Bernauer 2002).

There has been significant effort also by international relations scholars who have focused their attention on state power, interdependencies and domestic politics. This has been instrumental in guiding discussions on water and international security, including institutional and organizational approaches. Connecting these fields however, has been a new focus on organization of collective action based on negotiation studies (Dinar *et al.* 2006: 27). These studies have mainly focused on aspects of state party motivation; third party mediation, linkages, and culture, including tools to understanding different bargaining outcomes (see Dinar *et al.* 2006: 25-42). However, all these aspects of organization of collective action for regime creation in transboundary water basins seem connected.

Klaphake and Scheumann (2006) observed that international scientific literature on analysis of drivers and constraints of international water cooperation has increased over the years. They assert, only a limited number of international water bodies have so far been analyzed and methodologically ambitious studies on the formation of international water regimes are rare. Bernauer (2002), and Klaphake and Scheumann (2006) argued that, most analyses for regime building are single-case analyses that do not adequately link theoretical concepts with empirical analyses and findings.

Understanding organization of collective action is important not only for regime creation analysis but also the whole regime effectiveness analysis (Vogler 2000: 38). Mathiason (2008) identified the following key steps to consider in regime creation. Firstly, raising the salience of the problem; there has to be consensus that a problem exists and needs to be addressed i.e. problem identification. The impetus can come from any of the three classes of parties (i.e. the government, civil society and secretariats) based on their interest and experience (*Ibid*)**.**

Secondly, defining the factual parameters of the problem; the facts about the problem can be discussed in international bodies, academic discussions, inter-agency meetings and a consensus must be reached i.e. problem conceptualization. Thirdly, to establish a framework; usually through conferences or dedicated meetings set to work out normative frameworks for regimes e.g. problem contextualization and agenda setting. The negotiation process may take several years before the adoption of agreed text.

Fourthly, initial implementation and structuring of institutions; this involves the negotiations to set up implementation machinery. This can be very contentious since it defines the extent to which states are willing to cede functions or even sovereignty to an international organization. It may also involve initial unilateral steps by governments. The fifth step, periodic reviews of the regime and elaboration of details; this involves a work program to explore details of the agreement with the view to modify the regime within the broad parameters. It may also involve review conferences which may lead to further agreements.

Sixth, routinizing implementation through institutional framework; once the regime is in place, then the machinery is expected to work. This may involve norm enforcement or diffusion. These steps can repeat themselves, especially step 2 up to step five before proceeding to step 6. In conclusion, effective regime creation will be likely where basin level institutions exist and where riparian-level institutions support cooperation (Hensel *et al.* 2006; Giordano and Wolf 2003). This therefore means studies of regime creation in international shared water resources need to adopt a multidisciplinary research approach for holistic or integrated problem identification.

Young and Osherenko (1999), Marty (2001) and Lindemann (2005) considered a criterion in which regime creation analysis was grouped into the following independent variables: problem factors (Marty 2001; Lindemann 2005) and process factors (Keohane 1984; Schram Stokke 1997; Lindemann 2005). Problem factors are those factors that constitute the structure of the issue area while process factors refer to the procedure to cooperation and signing of agreements. These can be utilized to examine the hierarchical process of the organization of collective action for regime creation. Such an approach has substantial advantage in explaining regime creation (Young and Osherenko 1999: 226). These factors are explored in

the following subsections. This explores for regime creation as a process that involves two major factors, namely: problem factors and process factors.

Problem factors

A major feature of the process of regime analysis is to understand the nature of the problem(s) addressed. However, 'the definition of the problem can be a tricky procress' (Breitmeier *et al.* 2006: 36). Zurn (1992) observed that, problems are socially constructed and involve, human actions affecting the environment, or conflicts that determine the situation structure of an issue area. The success in obtaining collective optimum on an international problem has been considered as a process which determines regime effectiveness (Vogler 2000). Such a process is considered effective when it addresses the issue area, all the actors, and solves the problem it addresses (*Ibid*).

Mitchell (2006) confirmed that, to accurately assess the relative effectiveness of international environmental agreements requires that we pay greater attention to how problem structure influence both institutional design and outcomes we use to evaluate institutional effects. Accounting for problem structure is crucial as it interacts with institutional variables as institutional design is endogenous to the problem structure-outcome relationship (Mitchell, 2006).

Mitchell identified four stages at which shortcomings related to incorporating problem structure in extant effectiveness research can be solved, namely: carefully describing analytically variations in problem structure, selecting cases to limit variations in problem structure, evaluating problem structure variables and their influence on design and functional characteristics, and lastly evaluating effectiveness in terms appropriate to problem structure

(Mitchell, 2006: 72-89). As such, empirical analysis of problem factors can be categorized into four categories, namely: problem identification, problem conceptualization, problem contextualization and problem pressure (Nikitina 2002).

Problem identification is the recognition and confronting of the field of uncertainty by putting pieces of information together (Golightly 1987:57). There has to be consensus that a problem exists. This is significant as it directs attention to the differences among key actors in regard to their roles in causing the problem and their likely vulnerability to the impacts of the problem (Breitmeier *et al.* 2006: 36).

Problem conceptualization is an integrative strategy to take expertise thinking beyond the facts and singular theories to the level of underlying concepts (Nikitina 2002). Relating concepts of the problem means uncovering interdependent relationships, justifying and displaying differences among them. In a multi-actor problem solving scenario, this is how the problem knowledge is generated and validated. This is crucial in problem solving as it displays where coherence and internal consistency on the problem conceptualization. It identifies where one needs to work out with great detail, exactness, or complexity in joint management for problem solving (Breitmeier *et al.* 2006).

Transboundary water problems are not easy to resolve as most problems are related to transboundary externalities (Lindemann 2005:5). In a lake ecosystem most problems are of collective nature i.e. due to common development activities and impose costs on both riparian and non-riparian members dependent on the lake's resources. As such affect the underlying incentive structure of all relevant actors (*Ibid*). Besides incentive structures, problems solving in transboundary water basins varies according to problem identification, understanding of problem background, its contextualization and conceptualization, and problem pressure

involved, i.e. perceived visibility of a given problem (Jänicke 1999: 77; Lindemann 2005).

Generally, problem conceptualization in transboundary water management has been based on use-value or the economic approach. Problem conceptualization in the form of externalities could be a recipe for successful regime creation, especially if there is a way to internalize such externalities (Rogers 1997).

Problem contextualization relates to the process of embedding knowledge about a problem (Nikitina 2002). It is humanization of knowledge about the problem by situating the problem in the actors' self, i.e. in the fabric of social welfare and economic development both in the present and future. Problem contextualization is organized around the production of consensual knowledge arrived at through contention derived from problem conceptualization through bridges and connections made of chains of associations, multi-causal and metaphorical linkages (Nikitina 2002). It involves interpreting the problem in different contexts, where different pieces of knowledge of the problem are interpreted over time on specific social-ecological welfare or/and economic aspects. This would generate some belonging to a particular way of problem meaning making (*Ibid*). It allows actors to make broad and easy connections of the problem. The purpose of problem contextualization is to place the problem in the ecological and socio-economic fabric and bring out its social responsibility.

Problem pressure relates to perceived visibility of a given problem (Jänicke 1999: 77). For example the problem of overfishing might not have exerted more pressure than the problem of water hyacinth invasion in the Lake Victoria basin. The higher the problem pressure

involved, the better the prospects for regime creation (Lindemann 2005). It is the problem pressure which sets in the process factors of regime creation.

In sum, this review of problem factors in the regime creation process has shown the importance of these contexts in deriving and understanding the effectiveness of regime effectiveness. Chapter 4 and Chapter 7 explore these contexts in determining regime creation and regime effectiveness in the Lake Victoria Basin respectively.

Process factors

While it is apparent regime creation is the oldest function performed by states when it comes to striking a balance in handling international matters, it is assumed to be a "process which is at least in the hands of the parties, a purposive exercise heading toward the establishment of rules, regulations and expectations governing the given issue area" (Krasner, 1983). Since the nineteenth century and early twentieth century, international agreements were reached through specialized agenda and negotiation conferences whose secretariats were temporary or were provided by states hosting conferences. Process factors in regime creation can be categorized into agenda-setting, negotiations and signing of agreements (Lindemann 2005).

Agenda-setting is the pre-negotiation stage in the process of regime creation after consensus on problem factor. In large, it is the process of issue redefinition and reframing (Lindemann 2005). However, Spector *et al.* (1994: 15) observed that, issue definition is becoming extremely information dependent and difficult, especially for developing countries. Many of countries lack resources for extensive data gathering and analysis. As such, international negotiations have become complicated and interlinked. They observed that solving multi-issue problems involve interaction of complex social, scientific, technological and economic

factors (*Ibid*). This has heightened the role played by third party actors, such as World Bank and other donor agencies, in process factors for regime building. They also observed that, actors have become critical adjuncts to the process of agenda-setting, thus influence the effectiveness of resultant regimes.

Negotiation is the process by which conflicting positions come together to to derive consensus (Zartman and Berman 1982:1). Spector *et al.* (1994) identified the following six characteristics that at least define the multilateral version of negotiation process, namely: multipartism, multi-issues, coalitions, consensus, multirole and rule-making (see Spector, *et al.* 1994: 8-9). Marty (2001: 38) asserted that, these characteristics consider mechanisms to balance incentive structures and instruments to reduce transaction costs for regime formation.

Maxwell (2005) observed that negotiation is a drawn-out and on-going process as parameters continuously become modified and refined. Maxwell identifies the following eight steps for negotiating collective action with bias to positivist and liberal institutionalist perspectives:

> "to keep the core group small, to develop trust-building from the beginning, use the same core group, make it awkward or embarrassing not to cooperate, choose the right issues, start to think of positive incentives, make the cost of defection high and lastly set up institutions to manage these interactions and relationships"

However, collective action in common pool resources is associated with free rider problem (Vogler 2000). Commitment to abide with collective decisions will be conditional upon assurance that others are doing likewise. To constitute the *sine qua non* of a workable regime,

Vogler (2000:38) points to the significance of reporting, monitoring arrangements and transparent information sharing.

Dinar (2000) observed that, transboundary water negotiations in Africa are characterized by rent-seeking and personal interests of decision makers. Klaphake and Scheumann (2006) asserted that, regional cooperation for transboundary water regime creation in Africa is appreciated as a way to receive additional external assistances with financial transfers being channelled into national projects. They indicated clientelism and patronage as important factors triggering water cooperation if international joint actions aid in implementations of prestigious projects. As such, negotiations may be based on how national elites will benefit largely ignoring local communities and environmental interests (Klaphake and Scheumann 2006).

Signing of agreement is the final stage of the regime creation process. While regimes are intangible and based on legitimacy, signing of agreements results from patterns of negotiations based on consensus (Mathiason *et al*. 2007). Consensus in negotiations takes more time and implies careful use of language. What is agreed must well be understood by all parties in the same way and in their own language. However, in most circumstances, this has not been the case (*Ibid).* Regimes cannot be based on fuzzy language.

Young and Onsherenko (1999: 223-51) observed that, consensus building for signing of agreements should consider the broader aspects of knowledge, interests, and power. They asserted that, these play significant role in shaping regime creation process (*Ibid*). The aspect of knowledge is relevant in order to distinguish between the different types of information

and their role in international decision-making. Shared knowledge affects collective action (*Ibid*). However, Conca (2006) observed that, international policy in shared water management is most often launched in the absence of key information about issues at hand.

Domrowsky and Grey 2002 observed that, the norm-and-rule based approach to regime creation in Africa is much more widespread. However, the contribution of these norms and rules to problem solving deserves analysis. Klaphake and Scheumann (2006) argued that, regime creation discourse in the continent overemphasize the risks of serious international conflicts and water wars, instead of integrated water resources management for sustainable development. However they observed that, some general water regimes establish basic principles for transboundary water resources, river- and issue-related regimes that provide framework for action in some watercourses (*Ibid*).

Scheumann and Muro (2005) observed that, water regimes in Africa prove different in terms of scope, specificity, regime organizations, financing rules, information exchange, dispute settlement rules, and participation of non-governmental organizations. They are mainly concerns of development of joint infrastructure (e.g. dams) and water allocation (fair sharing) (Klaphake and Scheumann 2006). Kipping and Lindemann (2005) observed donor involvement is a prerequisite to meet the funding requirements for regime creation in the region. As such, the influence of donor community is significant in regime creation and its effectiveness. However, regimes concerned with water pollution problem or integrated approaches that address different hydrologic, ecologic and socio-economic issues, remain scarce (Grey 1998; Giordano 2003; Nakayama 2003; Klaphake and Scheumann 2006).

Studies have shown that transboundary water regime building in Africa is focused on economic game theoretic perspectives similar to Prisoner's Dilemma that can be solved cooperatively if countries credibly commit themselves to cooperation (Mitchell and Keilbach 2001; Klaphake 2004; Klaphake and Scheumann 2006). Klaphake and Scheumann (2006) and Rangeley *et al*. (1994) asserted that, some basin-specific arrangements remain on paper and agreed norms lack implementation.

Drawing from Marty (2001) and Lindemann (2005), successful water regimes need to be specific, feasible, flexible, open and equipped with centralized organization. Specific regimes are problem oriented and should incorporate precise rules and procedures that structure the relevant actors behaviour for better management of the problem meant to address (Lindemann 2005). They argue in situations where precise rules and procedure are missing, there is room for expounded interpretation, and rule avoidance by relevant actors is inevitable. As such, the effectiveness of such regime is bound to suffer (*Ibid*).

In feasible international regimes, goals are set according to the available financial resources and personal resources. They argue, this is very relevant as goals must take into account available resources. However, resources availability, as observed earlier remains a major problem in transboundary water regime building in Africa. Marty 2001:47 observed that therefore transboundary water regimes operate under goals of limited scope.

Lindemann (2005) indicated flexible regimes allow changes in problem areas and operation. He asserted that lack of flexibility reduces regime effectiveness as existing problem solving

strategy may prove inadequate under dynamic social, ecological and economic circumstances. He observed that effective water regimes should have centralized organization structure that would coordination, communication and monitor dynamism and prescribe reforms.

This review has shown how regime inputs analysis is an important level in the process of analyzing the effectiveness of the environmental regimes (Chapter 1). The creation of water regimes and their effectiveness are two analytically distinguishable but interrelated aspects (Klaphake and Scheumann 2006). In accounting for the regime creation process for problem solving in the Lake Victoria Basin, this study explores how the various players were involved in the creation of the Basin environmental regime. Regime problem and process factors are decomposed to identify the generic elements of the regime creation process. From the foregoing review, regime creation analyses in Africa have rarely addressed the legal and moral values of regimes in addressing intended problems in water basins. The approach of this study is to evaluate how these values have been considered and prescribe recommendations for effective regime creation. See Chapter 4 for an account of environmental regime creation in the Lake Victoria Basin.

Transboundary water regime architecture (regime outputs)

The word architecture literally refers to the art of designing buildings and other physical structures. It is both the process and product of planning, designing and constructing space that reflects functional, social and aesthetic considerations. A wider definition may comprise all design activity from the macro-level (urban design, landscape architecture) to the micro-level (construction details and furniture). In the beyond postmodern view, architecture may refer to the activity of designing any kind of system (Wikipedia April 2010).

The debate between modern and postmodern perception of architecture considered architecture to be not a personal philosophy or aesthetic pursuit by individualists. It is rather a consideration of everyday needs of people and the use of technology to give a liable environment. There is a central relationship between the institutional design and its effectiveness (Brown-Weiss/Jacobson 1998; Victor *et al.* 1998; Mitchell 2001; Lindemann 2005).

According to Kline and Raustiala (2000) regime architecture refers to the nature of persistent set of rules, formal and informal, that prescribes behavioural roles, constrains activity and shape expectations. According to The Earth Governance Project (2008), the concept of architecture includes both synergy and conflicts: between different institutions in a given issue area; between the overarching norms and principles that govern interactions; and between norms and principles that run through distinct institutions in the issue area (EGP 2008:32).

Transboundary water cooperation takes the form of multilateral environmental agreements (MEAs) and it is the core of larger social institution, known as a regime. In other words, an environmental regime is a larger social institution, made up of MEAs (*Ibid*). Kline and Raustiala, 2000 refer to MEAs as 'textual accords that can be read, while regimes are social concepts, with no clear cut delineation or identification of parameters'. The concept of regime architecture is important in that it links MEAs to the array of surrounding norms and constraints (Kline and Raustiala 2000).

However, many policy domains are marked by a patchwork of institutions that are different in their legal character (organizations, regimes, implicit norms), their constituencies (public and private), their spatial scope (from local to global) and their subject matter (from specific policy fields to universal concerns) (*Ibid*). In such situations, Kline and Raustiala (2000) observed that:

"the notion of governance architecture helps to conceptualize the overarching systems of public and private institutions, principles, norms, regulations, decision-making procedures and organizations that are valid or active in the issue area".

According to Christianson (1998) regime effectiveness depends on how much authority governments have vested to the international level. She identified the following five levels of transfer of authority. Level 1, known as international promotion or assistance, involve institutionalized promotion of or assistance in national implementation of international norms. Level 2, known as international information exchange, is the obligatory or strongly expected use of international channels to inform other states of one's practice with respect to regime norms. Level 3 is international policy co-ordination: it involves regular and expected use of an international forum to achieve greater coordination of national policies, but no significant review of state practice.

Box 2.1 Levels of transfer of authority

Level 1: Promotion of international norm

Level 2: Information Sharing

Level 3: Strategic implementation and coordination

Level 4: Monitoring and evaluation

Level 5: General effectiveness (Binding decision-making)

Level 6: Accountability Source:

Christianson 1998

Level 4, also known as international monitoring, involves formal international review of state practice but on authoritative enforcement procedures. Monitoring activities can be further categorized in terms of the powers allowed to monitors to carry out independent investigations and make judgements. Finally level 5 is authoritative international decision-making: It involves institutionalized, binding decision-making, including general effectiveness (Christianson 1998). Through transfer of authority regime architecture can be characterized into two broad analytic categories: substantive characteristics and procedural characteristics (see Table 2.1). The following sub-sections explicate these characteristics each in turn.

Table 2.1 The architecture of a regime

Procedural characteristics	**Substantive characteristics**
• Procedure (including definition of who the actors are, their interests, knowledge, power configuration; processes, decision-making procedures; boundaries identification etc.) • Organization	• Principles • Rights and responsibilities • Rules

Source: Gupta *et al.*1993

Substantive Characteristics

This section explores substantive characteristics of regime architecture. Substantive characteristics consist of principles, rights, obligations and rules (Gupta *et al.* 1993). Principles, norms and rules according to the standard academic usage in international relations are the key characteristics of a regime (Vogler 2000: 29). Vogler defines principles "as beliefs of fact causation and rectitude" while norms "as standards of behaviour" defined in terms of rights and obligations (*Ibid*: 30). Principles would include those shared scientific understandings as to the nature of the physical world upon which many commons regimes rest. Most significant principles associated commons regimes are actually those that define status in the form of property rights, while in the case of common sinks are those that define responsibilities (*Ibid*: 31).

Norms directly stem from principles and include operative extensions of the principles. They involve rights to use the various commons coupled with injunctions not to infringe the rights of other users (*Ibid*: 33). They can involve prohibitions of certain harmful activities. The UNCED registered the emergence and spread of norms relating to the practice of environmental protection in 1972. These summarized as Agenda 21, were inserted into commons regimes (Vogler 2000: 34). These include principles 15-17 of the Rio Declaration.

Rules are defined "as specific prescriptions or proscriptions for action" (Krasner 1983), constitute particular application of general regime norms and principles. According to Porter and Brown (1991), rules are codified in formal legal agreements and define characteristics of

regimes. The demand for clear specification of rights and responsibilities to a common resource coupled with effective monitoring and compliance mechanisms makes rules to be the appropriate instruments. As well as possessing some mechanisms for collective action. Vogler (2000: 37) observed that, regime must have most of the following rule related functions: standard setting, distribution, information, enforcement, and knowledge generation.

Rules are the defining characteristics of a regime (Porter and Brown 1991). They are usually codified in formal multilateral legal agreements. They can be softer and more informal in character and any institution can develop a set of understandings and accepted practises that supplement its more formal rules, however, identifying such rules is a problem. Categorization of rules depend on the analyst, however the most obvious way is to consider how different types of rules relate to the functions of the regime. There should be clear definition of rights and responsibilities to a common resource coupled with effective monitoring and compliance mechanisms (Berkes, 1989; Ostrom 1990). Two broad categories are identified by Wouters *et al.* 2005, namely: substantive rules and procedural rules. They refer to substantive rules as:

> "those rules that encompass those provisions of international legal instruments that establish the material rights and obligations of the parties vis-a-vis what the TWC State must do or do not do in order to achieve the purpose and objectives of the agreement".

They identify two types of substantive rules, namely 'obligations of conduct' and 'obligations of results' (*Ibid*). Obligations of conduct, "demands a State to act in conformity with a

particular standard of conduct". The "obligations of results usually require a State to undertake certain actions in order to realize the aims of an agreement" (*Ibid*). Despite the difference in scale, domestic experience provides a good starting point for the analysis of the types and functions of rules at the international level (Vogler 2000: 37). For ensuring collective choice, regime is supposed to have all or most of the following rule-related functions: standard setting, information distribution, enforcement and knowledge generation. These provide a basis for regime rules classification (Vogler 2000: 37).

Procedural characteristics

Procedural characteristics relate to decision-making procedures, procedural principles and practices, organizations, and institutions (see table 2.2). Standard setting involves promoting desirable actions and prohibiting others (Vogler 2000: 37). In environmental management, it covers the whole range of rules for environmentally beneficial behaviour and including technical standards that are required. Information distribution requires rules and procedures for the allocation of shared or use rights to a common resource, plus obligations in terms of provision and renewal (*Ibid*). Basic to any commons regime they are graphically illustrated e.g. quotas or total emissions. In such circumstances, collective action is dogged by the free-rider problem, commitment to abide by collective decisions depends on adequate assurance that others are doing likewise (*Ibid*). Thus reporting and monitoring arrangements and transparent information sharing are likely to be the *sine qua non* of a workable regime (Vogler 2000: 37).

Drawing from Gupta, *et al.* (2003), the mechanism and processes of regimes can be determined by identifying visible and less visible components of procedural and substantive elements of the regime architecture (see Table 2.2). Gupta *et al*. (2003) identify visible procedural elements as procedural principles, procedures and practices, and organization. The less visible regime procedural elements include national procedure and strategy, procedural problems, informal decision making and networking and influence from other actors (*Ibid*). Substantive visible elements include goals, principles, rights and responsibilities, and rules, while the less visible substantive elements are categorized as morals, value perceptions or ideology, interests, conditions and hidden agenda (both domestic and regional).

Turton *et al.,* (2003) observed that less visible elements of a regime help to filter out information and therefore help in the preparation of position in a given issue (ch.3). They are actually the 'active ingredients' in regime analysis and help discover cause-and-effect mechanisms to reveal the effects of regimes. To understand these active ingredients analysts have to decompose the regime architecture.

Table 2.2 Visible and less visible architecture of a regime

	Procedural elements	Substantive elements
Visible components	• Procedural principles • Procedures and practices • Organization	• Goals • Principles • Rights and responsibilities • Rules
Less visible components	• National procedure and strategy • Procedural problems • Informal decision-making • Networking and influence from other actors	• Morals (cultural) • Ideology (Values, perceptions) • Interests • Conditions • Hidden agenda (domestic and regional)

Source: Gupta *et al*. 1993.

Gupta *et al.* (2003) observed that, mechanism and processes of regimes can be determined through visible and less visible components (see Table 2.2). However, most regimes face the problem of monitoring and transparent information transfer, which are derived from regime architecture.

Enforcement/compliance is closely allied with monitoring function. Among sovereign states, there is need to develop mechanisms that will have more subtle self regulatory character (Barrett 2003). Vogler (2000: 38) observed that, there has been immense focus on imposition of formal sanctions, however, the whole governance problem stems from the undesirability and impossibility of central coercive authority. The threshold of recognizing a regime is when substantive and procedural elements display some 'degree of durability and effectiveness' (Gupta *et al.* 1993).

Transboundary water regime impacts (impacts)

Regime impacts refer to whether the actors were compliant to rules that addressed intended problem or their welfare changed in regard of regime targets (Biermann and Bauer 2004: 191). Regime impacts involve putting international commitments into practice. It occurs at the international level through setting up of secretariats, regularized meetings and establishment of organizations. It also occurs domestically or regionally through passage of legislation promulgation of regulations and enforcement of rules. This transforms MEAs from legal documents to functioning regimes. This is critical step towards compliance;

however, compliance can occur without implementation, i.e. without any effort by government or regulated entity (Kline and Raustiala, 2000).

Environmental impact assessments were founded after the passage of US National Environmental Policy Act 1969, which requires all federal agencies to assess programs and policies that have significant impacts on the environment (Knaap and Kim 1998:7). Environmental impact assessments are "generally conducted for programs and activities not specifically directed toward environmental improvement or preservation" (*Ibid*). They are predictive in orientation; designed to project the of proposed policies or programmes, not impacts of those already in place" and are generally focused on the negative effects of programs on the environment, not considering whether such programs might be favourably affect the environment in cost-effective way or desirable manner (*Ibid*).

To examine the impacts of regime structural characteristics, the (substantive characteristics), the method of subobjectives by Mohr (1995) is employed. Sub-objectives are generic elements of the substantive characteristic (joint management) and procedural characteristic (precautionary approach) adapted to solve the problem of environmental degradation in the basin. They form a basis for inferring connection in the cause-and-effect mechanisms (Chen 1990: 191-218). As such, they permit modelling of causal processes to help validate regime impacts. This has the effect of making impact assessment accessible within a qualitative research paradigm (Mohr 1995: 248-273).

Depending on the nature of programme implementation, impacts may be evaluated from outcomes of programme components in implementation phases and/or implementation pilot

zones, in terms of their ability to attain intended goals, (e.g. to step-down environmental degradation). This is followed by a third level of impacts evaluation whereby the effects of environmental improvements are assessed for improvement of social welfare. The interplay of these three levels of impact evaluation criteria gives the extent of regime impacts. This criterion is employed here to analyze the impacts of international environmental regime in the Lake Victoria Basin (see Chapter 6). The regime is decomposed to regime subobjectives, and further to subobjectives through the method of subobjectives (Chapter 3).

On the other hand, to evaluate the procedural characteristics of the regime both *modus operandi* method (Chapter 3), using physical causal reasoning, and causal proximity or causal distance approach are employed. Both substantive and procedural characteristics are investigated to qualitatively evaluate cause-and-effects mechanisms of the regime and how they attend to the problem of environmental degradation in the Lake Victoria Basin (regime effectiveness).

It is time therefore for research to further evaluate the impacts of these interventions to understand where the problem lies. International river basin regimes that focus on smaller number of issues (core), with detailed and operational regulations, tend to be more effective in attaining their goals (Marty 2001; Bernauer 2002: 561). Causal assessments play an equally important role in the regime process tradition where researchers identify the causal factors shaping the regime agenda, decision making styles, state-society relations, and the dynamics of stability and change (Baumgartner and Jones 1993; Rochon and Mazmanian, 1993; Sabatier, 1999). Regime impacts analyses have to be based on assessment of causal impacts in small-N research settings (Steinberg, 2007: 181-204).

Transboundary water regime effectiveness

The term regime effectiveness has been defined various by many scholars. In the 'Mid-term report' (Young 1997), in the 'Institutions of the Earth' (Haas, Keohane and Levy. 1993), in Regime Effectiveness (Victor, Raustiala and Skolnikoff 1998), and Underdal (2002), in Miles *et al.* (2002). Regime effectiveness can have many sources (Kline and Raustiala, 2000). Distinguishing the causal impacts of a regime from other factors poses a major challenge to regime analysts. However, understanding the full range of causal variables can help explain and improve effectiveness.

International regime effectiveness is a measure of the role institutions play, as determinants of the content of individual and collective behaviour (Kline and Raustiala, 2000). The outcomes of regimes will not conform to the requirements of efficiency, equity or any other criteria of evaluation (Young 1992). The effectiveness of international regimes varies directly with the ease of monitoring or verifying compliance with their principal behaviour prescriptions. To analyze impacts or compliance of regimes involves three sets of considerations (Young 1992:176). Firstly, the ease with which violations on the part of the subjects can be detected. Secondly, the probability to which violators will be subject to sanctions of one kind or another and third, the magnitude of the sanctions imposed (*Ibid*).

On the other front, the effectiveness of international regimes is a function of the robustness of the social choice mechanism they employ. International institutions ordinarily establish procedures for arriving at social choices. The effectiveness of international regimes varies directly with the stringency of acknowledged rules governing changes in their substantive provisions. Even regimes with well-defined and widely acknowledged procedures governing change, there is great variation regarding the stringency of the requirements imposed on those

endeavouring to bring about alterations

Although most regime effectiveness studies have focused on compliance, a necessary condition for effectiveness, it is not sufficient (Kline and Raustiala, 2000). Where MEAs match current practice, their implementation is unnecessary and compliance is automatic and in such cases regime effectiveness of is basically zero (*Ibid*). However, it is not right to say that implementation of MEAs is not necessary, however not sufficient for regime effectiveness (*Ibid*). One can have perfect compliance within a regime and still be ineffective in tackling the problem itself (Borzel 2002; Raustiala and Slaughter 2002).

Different theoretical approaches to transboundary water regimes analysis

This section provides an overview of different international relations theoretical perspectives on transboundary water regimes analysis. There is no single theoretical concept whose explanatory power could adequately address how regimes address transboundary water management (Bernauer 2002; Kalphake and Scheumann 2006). As such, a mono-theoretical approach to transboundary water regimes effectiveness analysis cannot adequately explain the mechanisms and causal chains involved especially in complex Africa situation (see Klaphake and Scheumann 2006). Such an application of these theories to this sector or a specific attempt to construct such theories is significantly absent except for their application in the 'water discourse' (see du Plessis 2000; Swatuk and Vale 2000b; Furlong 2006).

duPlessis' (2000) application of international relations theories was focused on macro-theoretical debates and does not specify how these theories are mobilized (Furlong 2006:

441). He advocates for constructivist research paradigm to counterbalance the shortcomings of neo-realist and neo-liberal approach. Furlong (2006: 441) explores theorization outside international relations theories to show how normative theories are used to understand the substance of watercourse agreements. Keohane (2001) argued that multi-theoretical approach is necessary to ensure that international organizations function non-exploitatively. Two decades ago, Haggard and Simmons (1987) identified four theoretical models to regimes analysis namely: structuralism; strategic and game-theoretic approaches; functional theories; and cognitive theories.

Theoretical reflections on regime inputs

Mearsheimer (1994) and Grieco (1995) observed that theory is relevant in understanding cooperative arrangements as restricted instruments in the power politics game. In analyzing regime creation neo-liberal institutionalism theory assumes, in the long run there will be a gradual lessening of anarchy among the basin states through creation of a regime. It supposes the modification of anarchy in the international system through the building of framework regimes and formal organization (Emmers 2006). As such, international environmental problems are characterized in terms of collective choice (Ostrom and Keohane 1995).

This theoretical assumption seems most appropriate to the study of functional cooperation (Emmers 2006), and therefore, significant in the analysis of the effectiveness of regime creation process. For neo-liberal institutionalist, regime creation analysis involves examining how states as self-interested actors display utility-maximizing behaviour. They assume a state rationally participates in a regime in order to promote its long-term interests. Cooperation is

therefore not short-term or limited, and a great deal of attention is given to the issue of information sharing (Keohane and Martin 1995: 43), thus a procedural than substantive focus to regime creation.

Two conclusions based on this theory can be drawn. Firstly, there must be common interest for cooperation among the basin states 2006). Secondly, there must be variation in the degree of institutionalization for substantial effects in state behaviour (Keohane 1989: 2-3). According to Emmers (2006), lack of interests leads to absence of institutions and thus stability and possibly conflicts.

Realists assume states are major actors in world politics and that anarchy serves as a major constraint that shapes states' preferences and actions. Realists have traditionally advanced the theory of hegemonic stability (Kindleberger 1973). The theory argues that the creation and persistence of a regime is dependent on the influence and participation of a single powerful state, the hegemon. This conception of hegemony holds that hegemonic structures of power, dominated by a single country are conducive for the creation of effective regimes whose rules are precise and well obeyed (Keohane 1980: 132). As such, effectiveness as collective action is seen to be influenced by a hegemon.

Agnew and Corbridge (1995: 17) argued that, the hegemonic ideology of contemporary geopolitical order is market liberalism. It is dominated by certain western states, integrated by worldwide markets, and regulated by international monetary and trade organizations like World Bank, IMF and WTO (*Ibid*: 193; Furlong 2006:443). It is these "ideas of

governmentality that degrees of force and reason ... ordered visions of space, territory, geography are imposed upon ambivalent lands, terrains, and cultures to coincide with imperial imperatives and perspectives" (Furlong 2006: 443).

Constructivism as a theoretical approach rejects the assumption that states are unitary and self-interested actors displaying utility-maximizing behaviour and the theory of hegemon stability (Armstrong *et al.* 2007). It adopts a sociological approach to the study of international relations for regime creation. Constructivism not only identifies material factors such as the distribution of power in the international system, but explains them in the context of social structures. As such, it considers the logic of anarchy as socially constructed (Wendt 1992) and rejects the assumption that states are utility maximizers with precise and given interests that can be promoted through cooperation (Armstrong *et al*. 2007). It claims attention to be given to the formation and evolution of identities and norms associated with the process of institutional-building. Such socialization processes may induce identity change and result in the construction of a collective identity among regional states (Emmers 2006).

According to Armstrong and colleagues (2007), the core principles of constructivism theory in the creation of international regimes can be summarized as follows. Firstly, they focus on norms (ethical, political, and legal) as explanatory variables in world politics (Armstrong *et al.* 2007:102). Secondly, constructivists see international regime as social structure that exist only when there is a norm i.e. *opinion juris* and state practice (Finnemore *et. al*. 2001: 139). Thirdly, constructivists seek to explain the process of progressive normative change (Armstrong *et al.* 2007: 102).

Structuralism is the explanation of political effects, outcomes and events exclusively in terms of structural or contextual factors (Hay 2002: 102). It is a 'response to and rejection of the society-centred or input weighted theories' that dominate regime creation or formation analysis (Hay 2002: 105). Realism and neoliberal institutionalism theories tend to place regime creation in the 'logic of calculus', on the other hand, constructivism and structuralism places it in the 'logic of appropriateness' (*Ibid*). Hay observes:

> "Conduct is context-dependent, not because it is rational, in pursuit of given set of preferences for actor to behave in a particular manner in a given context, but because it becomes habitual to do so" (Hay 2002:106).

As Hay suggests, structuralism 'emphasizes the ordering or structuring of social and political relations in and through the operation of institutions and institutional constraints' (*Ibid*). Institutions are normalizing as they tend to embody shared codes, rules and conventions, thereby imposing political subjects' value-systems which may serve to constrain behaviour (Brinton and Nee 1998: Part1). However, institution creation may be constrained by reliance upon existing institutional templates (DiMaggo and Powell 1991).

DiMaggo and Powell (1991) emphasized that, the importance for regime creation analysis to place emphasis on context-based processes of institutionalization and normalization. They argued that, parameters of the possible become confined through the emergence of habits and norms and their reinforcement over time such that rituals become normalized (*Ibid*). According to Hay (2002):

"we behave the way we do because we are habituated to behaving in such particular ways in particular contexts, because it becomes potentially risky to imagine ourselves behaving otherwise" (Hay 2002: 106).

In summary, all the four theories offer significant insights into the understanding and analysis of transboundary water regimes. The insights of the three alternative theories: realism, constructivism, and structuralism are summarized in Table 2.3.

Table 2.3 Summary of theoretical lenses on environmental regime creation (inputs) in the Lake Victoria Basin

Realism	Constructivism	Structuralism
States are the major actors. Environmental problems are characterized in terms of collective choice. Anarchy shapes preferences and actions. States operate under the principle of hegemonic stability. Creation and persistence of a regime is dependent on the influence and participation of the powerful stakeholder, the hegemon.	Pursue sociological approach to regime creation. Define and explains the logic of regime creation. Considers material factors, context and social structure. Regime creation is the formation and evolution of identities and norms. Knowledge output important in regime creation. Identities and norms associated with process of institutional building. It creates social structures.	Considers regime creation in terms of structural or contextual factors. Regimes emerge and evolve out of human behaviour Considers the role of agents in the constitution of context within which conduct occurs and acquire significance.

Theoretical reflections on the regime outputs

The analysis of regime architecture is based on neo-liberal institutionalism theory which views regimes as encompassing core community values. It highlights the normative

imperative of the actors through identifying ties between the various actors. Neo-liberal analysis of regime architecture emphasizes the relevancy of fundamental moral principles in the regime architecture. As such, it challenges the core legal theory principle that law should be separated from morality (*Ibid*: 88). “For liberals this position robs law its purpose” (*Ibid*). The legal theory situates law in the political context within which it is created and operates (*Ibid*). Law is not simply a system of rules to regulate state behaviour, but rather part and parcel of international policy-making (Armstrong *et al.* 2007; Higgins 1968; Lasswell and McDouglas 1943). “This is a prescriptive approach to international law quite unlike the descriptive approach of legal positivism” (Armstrong *et al*. 2007:88).

The “notion that international law is comprised of only those to which states have consented, cloaks tough moral choices that need to be faced in developing a functioning world order” (Armstrong *et al*. 2007:88). Values that serve the interests of most community members, in particular, human dignity, must take priority so as to develop a stable and sustainable world public order (*Ibid*). This neo-liberal institutionalism approach to analyzing regime architecture places people, law and ethics at the centre of the analysis. The human agency is conceived as operating through authoritative decision-making processes, defined and legitimated by international law, and by which individuals and institutions exercise power, deploy resources and realise values (McDouglas and Lasswell (1960). According to Armstrong and others (2007: 89), neo-liberalists adapt “agent-centred view of things that recognizes the mutually constitutive functions of power and law in social order, as well as political struggle over values and possibilities for progressive social development”.

Regime architecture under neo-realism theory is associated with the capacity of a hegemonic player to promote and lead cooperative arrangements within the international system. The

hegemon uses power to shape the regime and make sure that it continues to favour its own interests. The realists see states with power to ignore international law and other non-state forms of power. Realists take a minimalist view of regimes as binding rules to which states have explicitly consented in regimes and tacitly consented in customary practice (*Ibid).*

Three core realist principles account for regime architecture. Firstly, states are the only significant actors, and secondly, the international system which is anarchic is fiercely competitive (Schweller, 2001). Thirdly, material factors matter far more than non-material factors such as, norms, institutions, and international law. Fourthly, states are rational actors, and rational action ultimately depends on self-help (Waltz 1979). Fifthly, realism has a systematic focus (Brooks 1997).

However, realists warn of the danger of legalistic-moralistic approaches to world politics (Arend 1999: 292). They sought to separate law from everyday politics and moral debate. They consider the world to be too dangerous for states to pay much attention to moral concerns. States should focus on what they are doing to survive (Armstrong *et* al., 2007: 78). New realist scholarship recognizes that statecraft ought to have some moral purpose (Welch 1996; Booth 1991; and Williams 2004) even though Waltzian scepticism persists. Many realists believe states make the world safer by focusing on balancing power and this serves the larger human good (see Desch 2003).

Realism offers structural approach to regime architecture. To the realists the international system contains three main elements: the units (states), the ordering principle (anarchy), and the distribution of capabilities among the units (the number of ordering powers) (Waltz 1993). Realists bring in the idea of polarity of the world: bipolar or multi-polar world which

are relevant in understanding the architecture of regimes. In analyzing regime architecture realists see the aspects of balance of power and rules of international law to be intertwined.

According to Carr, 'politics and law are indissolubly intertwined' though the 'ultimate authority of law derives from politics' (Carr 1939; Morgenthau 1993: 176). However, Morgenthau argued that, the weakness in international law was the lack of effectiveness. He asserted that, it did not matter whether greater majority of rules in international law are voluntarily complied with, considerations of power rather than law determine compliance and enforcement (Morgenthau 1993). Carr and Morgenthau argued international law required a balance of power to function (Carr 1939; Morgenthau 1993: 176). Therefore realist contribution to regime architecture analysis is the separation of morality from the mechanisms for ordering world politics, namely: primacy of states, the balance of power and the rules of international law (Armstrong *et al*. 2007:83).

On the other hand, constructivism focuses on the importance of social structures that include shared knowledge, institutions, identities, norms and rules. In examining regime architecture, it concentrates on the importance of identity and norms, as well as the prevailing economic, political and cultural conditions (Amitav 1998; Busse 1999; and Amitav 2001). Such normative and social structures are believed to determine the behaviour of the social actors involved in the international politics (Armstrong *et al.* 2007). It also recognizes agency as not only state primacy but also the role of non-state actors in influencing normative change.

Much of constructivist analysis is directed towards explaining that rationalists cannot explain namely norm-compliant behaviour in the absence of incentives, sticks and carrots (*Ibid*).

Again, the constructivist theory helps to explain the structuralism theory in that it is key in recognizing the role of both structure and agency. Fundamental aspect of constructivism theory to regime architecture analysis lies in the notion that legal norms 'play a constitutive role in the formation of actors' identities and interests and in the structure of the international system itself' (Slaughter *et al.* 1998: 382). As such it defines the sources and substance of international law (Kennedy 1988). International regime is considered as a 'particular sensibility' or a set of attitudes and preconceptions about matters international' (Koskenniemi 2005: 1-3).

Toope (2000:102) argued that, there is considerable competition between beliefs and interests in the process of determining norms, thus norm construction, enactment and change involves politics. Armstrong *et al.* (2007) observed that politics significantly influence regime creation, and thus the effectiveness of international regimes. International regimes are supposed to serve, to define, and validate state sovereignty and jurisdiction; to protect the core interests of most states and humankind; to advance those core values shared by all states and to enable states to co-operate (Armstrong *et al.* 2007:105).

While structuralism focuses less on operational aspects of regimes, it accounts for regularities in observed patters of political behaviour in a given context (Hay 2002: 102). It considers systemic logics to be operating among the various contexts independent of actors (Hay 2002: 106). As such, it appeals to systemic logics (logics operating at the level of the system as a whole. Through structuralism, regime architecture is assessed intersubjectively among the various contexts, defining it in terms of rules, norms and conventions, as such, it appeals to political explanations of behaviour (*Ibid*). In this way, structuralism makes regime architecture appeal to political explanation (*Ibid*). In sum the above three theoretical lenses of

realism, constructivism, and structuralism are significant if we are to understand the architecture of the environmental regime in the Lake Victoria Basin and its effectiveness. The contributions of these theories are summarized in Table 2.4 below.

Table 2.4 Summary of theoretical lenses on regime architecture (outputs)

Realism	Constructivism	Structuralism
States consider regime architecture as the balance of political power. States are the main units Anarchy is the ordering principle in regime architecture. The number of ordering powers determines the distribution of capabilities among the units/states.	Regime architecture considers interstate logic defined by identities and norms. Regimes seen as fundamental institutions that structure interstate relations. Regimes seen as generic structural elements of international society. Regimes architecture based on three meta-values- moral purpose of states, norm of sovereignty, and norm of pure procedural justice.	Focus less on operational aspects of cooperation. It accounts for regularities in observed patters of political behaviour in a given context. Defines the logic of appropriate behaviour. Regime architecture is considered intersubjectively dependent on contexts. Regime architecture defined in terms of rules, norms and conventions Embodies set of ideas possible, feasible and desirable Embodies a set of means, tools, and techniques appropriate to attain desired goals.

The theoretical perspectives on regime impacts

While neo-liberal institutionalism theory assumes in the long run there will be a gradual lessening of anarchy among the basin states through creation of a regime, realists see problem solving to be through coercion. Impacts are imposed through a 'Programme of Measures' (PoMs) by the most powerful. According to neo-realists, a regime cannot survive the decline of the hegemon (Armstrong *et al.* 2007).

Constructivism focuses less on the functional dimensions of regimes and operational aspects of cooperation. It points to the process whereby actors are socialised into identification and following of norms (*Ibid*). This socialization process involves elite learning of new norms, institutionalisation of norms in official policy, community laws and organizational structures, and internationalisation of norms in community discourse and culture (*Ibid*: 98).

Elite learning may be driven by sanctions or self-interest and therefore occurs at shallow levels. Institutionalization is crucial as it embeds and empowers norms in community practise. Internationalization is a deep learning process whereby actors through socialization accept the new norms as legitimate and appropriate, however, even shallow learning can lead to internationalization, once internalized, norms are enacted automatically by actors (*Ibid*). Emmers (2006) argued that, this limits constructivism application to the study of formation and maintenance of regimes. It denaturalises the power of states take for granted: the power to tax citizens, to control domestic markets, and to use force at home and abroad (*Ibid*).

Constructivism reveals the interplay of rational and social action in the regime creation process. What is considered as rational action is socially determined by norms and identity and norms are in turn deployed rationally by 'skilled users of culture' (Swidler 1986; Farrell 2005) to bring about impacts to intended problems. To constructivists, these activities have the power to transform the identities of states and other actors in transboundary water governance through 'internalized obedience' rather than 'enforced compliance' (Koh 1997: 2598-9).

Structuralists see impacts in terms of a reflection on the relationship between structure and agency, context and conduct. These reveal the crucial mediating role of ideas and ideational factors are significant in the causation of political outcomes or impacts (Hay 2002: 166). As

Hay asserts, “actors must interpret their context in order to act strategically. Consequently, interpretation of the environment in which they find themselves into various systems play a crucial role in shaping actors’ behaviour with consequent effects for the process of political change” (*Ibid*). The contributions of these theories to regime impacts are summarized in Table 2.5 below.

Table 2.5 Summary of theoretical lenses on regime impacts

Realism	Constructivism	Structuralism
Problem solving is based on consent with the hegemon. Its main implementation approach is coercion by the hegemon. Uses and imposes Programme of Measures (PoM)	Actors socialized into identification and following of norms. There is elite learning of new norms. There is institutionalization of norms in official policy, community law, and organizational structure. There is internationalization of norms in regional or community discourses and culture.	Focuses less on the functional dimensions of regimes. Consider regime impacts as ordering of social or political relations through operation of institutional constraints. When structures influence agents that brings about changes in contexts (i.e. structural elaborations) Parameters of the possible become confined through the emergence of (intersubjective habits and norms, and their reinforcement Explains effects, outcomes and events.

Theoretical reflections on regime effectiveness

Regime effectiveness in this study is based on the neoliberal institutionalism theory. Armstrong and colleagues (2007) identify three core values of the liberal institutionalism theory that can also be drawn from this analysis. Firstly, the notion of international regime creation includes more that rules codified in treaties and embedded in custom. Secondly, law should be directed to promoting core community values. International regime creation is authoritative decision-making processes that sustain and are sustained by the systems of

social, political, natural and strategic order (Byer 1999; Armstrong *et al*. 2007: 92). Thirdly, international regimes perform a broad range of functions (Armstrong *et al.* 2007: 92). Slaughter Burley (1993) argued that regimes should be viewed as enabling and facilitating international relations by providing modes of communication, legitimization, reassurance, co-operation and habituation (Slaughter 1993: 209). The fourth point is prioritizing of agency. As such, analysis of "influence of agency is fundamental as national policy is informed, harmonized and enforced by these transnational or state-agency networks" (*Ibid*).

The section draws insights from three theoretical lenses, as observed earlier, namely: realism, constructivism, and structuralism. Each of the four theories offers multiple insights for regime effectiveness. As such, regime effectiveness does not fit easily into a single theoretical perspective. This is because specific aspects of environmental regime effectiveness can well be accounted for under different theoretical perspectives (Armstrong *et al.* 2007: 269).

On the other front, the realist theory considers regimes as rather insignificant in the international politics by concentrating on anarchy and related matter of relative gains. As such, considers regimes as epiphenomenon premised on power relations. Realists see regime effectiveness as a function of power relations based on the result of coercion (Armstrong *et al.* 2007). Coercion, central to command theory, is where legal rules depend on sanctions to be effective. In this perspective, realism suggests, where powerful states have an interest in a particular issue area, they may coerce other weaker states (*Ibid*). On the other hand, consent is expressed as free will of states to come into agreement and form treaties. It is codified in modern international law under Article 52 1968 Vienna Convention on the Law of treaties, which states that:

"a treaty is void if its conclusion has been procured by threat or use of force in violation of the principles of international law embodied in the Charter of the United Nations".

However, coercion is legal through sanctions (Armstrong *et al.* 2007). To realists, regime effectiveness is attained through consent and coercion. States seek to shape the content of agreements in ways that reflect their specific interests and are conscious not to enter into far reaching binding commitments. As such, they prefer looser and more flexible 'framework' agreements even under potentially calamitous consequences. These realist aspects are fundamental in regime effectiveness analysis for reforms. This analysis has shown, "classical realist explanatory forces of power and state-centrism still guide broader parameter within which any kind of environmental regime can emerge" (Armstrong *et al.* 2007: 270).

Constructivism theory on the other hand, explains regime effectiveness from the social world perspective. As such, regime effectiveness is seen as a result of three reasons, namely: persuasion, congruence, and habit (Armstrong *et al.* 2007: 109). Effectiveness comes after persuading states to abide by legal norms. This function has been promoted mostly by non-state agencies, actually the only tool at their disposal (*Ibid*). It rests on expertise and/or moral standing of non-state actors. States also may rely on persuasion to induce peers as is most the case in N-S relations when material power is unavailable or inapplicable. As Gillespie (1997) asserts, transnational epistemic communities: a transnational network of professionals with recognized expertise and compentence in a particular domain (Haas 1997:3) help to bring about what amounts to a normative paradigm shift over issues ranging from moral rights of animal rights to obligations of the rich to the poor.

Regime effectiveness is seen as a result of the level of congruence between the norm in question and the normative system of the compliant or non-compliant state. When there is congruence, norm-following behaviour is more likely than where there is not (Armstrong *et al.* 2007). Checkel (2000: 70-2) argued that, the aspect of congruence can be plotted in a running scale from norm match to norm clash. Koh (1997) suggested that, when international regimes get internalized in legal system through executive action, judicial interpretation, legal action or some combination of the three, it produces 'institutional habits'. Hence regime effectiveness becomes a matter of habit and the existence of successful regime.

Table 2.6 Summary of theoretical lenses on environmental regime effectiveness

Realism	Constructivism	Structuralism
Regimes insignificant: Prefer loose and more flexible framework agreements not to compromise interests Existence of consent and coercion Effective sanctions	Normative paradigm shift over contentious issues. Moral suasion Congruence in norms Internationalization of norms in institutional habits	Regimes emerge as material factors constraining behaviour. Context-dependent norms emerge to conform out of habit and of our own volition. Habituated to behave in a particular manner in a given context. Self-constraint, as it becomes difficult and particularly risk as a consequence to imagine behaving the otherwise. Agents influence context to improve social welfare.

Conclusion

The chapter explored the theoretical perspectives of transboundary water effectiveness analysis. It first reviewed the evolution of the concept of international regime and sketched the emerging focus of interest in transboundarywater regime effectiveness. This chapter has

reviewed the concept of international regime in international water resources management. It has indicated how governance efforts are focused on interdependences through cooperation among basin states. However, current approaches for analyzing transboundary water regimes have not clearly come to focus on understanding these interdependencies and their effects. The chapter reviewed how the RALP model approach would effectively analyze transboundary water regimes. The evaluation of regime's evolutionary levels, through understanding the inputs, outputs and impacts is suggested here as remedial. Important in this evaluation would involve identification of regulatory mechanisms that would guard actors' behaviour in the form of 'programme of measures'.

The chapter explored the state of the art of international regime effectiveness analysis under the RALP model levels: it reviewed the concepts of international regime creation; regime characteristics namely: substantive and procedural characteristics; the concept of regime impacts (impacts) and how they could be understood on the wider transboundary water regimes. It also gave a general review on regime effectiveness and regime effectiveness analysis. It exposed by bringing the level together to show how hierarchy forms an essential tool for regime effectiveness analysis. The chapter also explored international relations and international law theories to regime effectiveness analysis for the purpose of validating the study.

As observed above, the effectiveness of international regimes varies directly with the stringency of acknowledged rules governing changes in their substantive provisions. Even regimes with well-defined and widely acknowledged procedures governing change, there is great variation regarding the stringency of the requirements imposed on those endeavouring to bring about alterations due to lack of focus on 'substance' to attain intended goals.

Chapter Three

CHAPTER 3

Exploring New Horizons in Transboundary Water Regimes Effectiveness Analysis

Introduction

This chapter explains the methods employed to answer the questions raised in Chapter 1. While research in regime analysis has focused on regime creation and implementation, recent studies have focussed on the question of international regime effectiveness analysis (Breitmeier and Wolf 1999: 335). Empirical regime effectiveness studies focus on systematic analysis to indicate regime effects on the intended problem (Young 1999: 4).

The rest of this chapter unfolds as follows. Firstly, Section two frames regime effectiveness analysis in the context of systematic hierarchical analysis process while Section three explores the ontology of regime effectiveness analysis. Section four considers the study epistemolgy. Section five describes the methodology for this study. It reviews and explains the methods toolbox for international regime analysis. Section six introduces the case study of the Lake Victoria Basin, East Africa. The section outlines the study aim and research questions, and how the later are going to be tackled. Section seven describes ways of verifying results through triangulation, test for validity, reliability and generalizability while Section eight draws conclusions on methods to the study.

Analyzing regime effectiveness: an overview

There are two basic questions that frame this regime effectiveness analysis. Firstly, is the question on the nature of analysis that forms the basis of analytical attention (a political question). Secondly, the status of claims which are made from the analysis (the question 'science' employed). The first question leads to posing basic questions about the nature of the political world itself, its boundaries and the constituent units out of which it is comprised (Hay 2002: 60). While the second question, seeks to understand "the potential about the object of enquiry and the means by which we might come to realise that potential" (*Ibid*). Hay observes:

> "The degree of confidence that we might have in the knowledge we acquire of our subject matter (our answer to the science question) depends, crucially on what we choose that subject matter to be (our answer to the political question). In short the claims we might make of our subject matter are conditional upon the nature of the subject matter."

Thus, it is important to understand the nature of regime effectiveness analysis (the political question) before exploring the body of knowledge employed in regime effectiveness analysis. Much of political analytical debate is currently conducted in specific language. That identified here as 'political question' refers to ontology, while the 'science question' refers to epistemology. Both ontological and epistemological issues have methodological implications (Hay 2002: 60).

Ontology, epistemology and methodology are irreducible and their relationship is directional. Ontology logically precedes epistemology that logically precedes methodology (*Ibid*).

The ontology

The nature of the 'political' regime effectiveness analysis, like any other nature of an analysis involves seeking further understanding from understanding the 'whole'. As such, it involves starting from the knowledge of the whole, then going deep through decomposition into its components, to evaluate what role the components have in making the 'whole'. According to Hay (2002:63), "Ontology relates to the nature of the social and political world, epistemology to that we can know about it and methodology to how we might go about acquiring that knowledge". Norman Blaikie (1993: 6) defined ontology as:

> "the claims or assumptions that a particular approach to social science enquiry makes about the nature of social reality- claims about what exists, what it looks like, what units make it up, and how these units interact with one another".

Hay (2002: 61) argues:

> "One's ontological position is, then, one's answer to the question: what is the nature of the social and political reality to be investigated? Alternatively, what exists that we might acquire knowledge of?"

The answers to such questions are very important to determine to a considerable extent the content of regime effectiveness analysis and what to regard as adequate explanation of the analysis. As earlier observed, the few transboundary water regime effectiveness studies, just as many other international regime effectiveness studies, have rarely positioned themselves

with this understanding (see Chapter 2). However, regime effectiveness studies may appeal to various ontological schemes. While for example, Fay's (1996: 31) 'ontological atomists' convinced in Hobbesian terms that "basic human needs, capacities and motivations arise in each individual without regard to any specific feature of social groups or social interactions". Hay's (2002: 61) 'ontological structuralists' "by construct, it is the appeal in human needs and capacities that is ruled inadmissible in the court of political analysis". As such, this regime effectiveness analysis is conducted under these 'ontological structuralists' premises. The choice of particular type of ontology is determined by the choice of research paradigm.

Research paradigms

Research in regime effectiveness analysis demands an appropriate choice of research paradigm: a set of agreements on how a problem is to be understood (Kuhn 1962: 1970). According to Thomas Kuhn, paradigms are essential to scientific inquiry (*Ibid*). Kuhn argues, working within a research paradigm guides the researcher on what is important, legitimate, and reasonable to operationalize and draw valid conclusions. As such, paradigms guide both the 'political' and 'science' questions. The increase in review of social science research paradigms stems from two major schools of thought that place knowledge as either real (objective) or built from human perceptions (subjective) i.e. quantitative or qualitative. This section explores the qualitative ontological discourse behind international regime effectiveness analysis namely: positivism and postpositivism that guide the choice for a methodological approach adopted by this study.

Positivism

The positivist paradigm asserts that reality lies on the things which can be seen with the eye (Grbich 2007: 4). It is based on the belief that all knowledge is accessible through reason and that the rational man has the capacity to uncover a singular knowable reality through pure understanding and rigorous intellectual reasoning (Cohen *et al.* 2000; Dash 2005; Grbich 2007: 4). Such broader processes to reasoning required to gain knowledge include a focus on observation in order to gain facts via scientific deduction. Positivist regime analysts, also called 'logical empiricists', view truth as absolute and value the original and unique aspects of scientific research such as realistic descriptions, truthful depictions, studies with clear aims, objectives and properly measured outcomes, a focus on neutrality, objectivity and theory testing (Grbich 2007).

Positivism views knowledge as being deduced from careful processes of hypothesising, variable identification and measurement within experimental designs (*Ibid*). This results in identification of causality and allowing predictions to be made about 'facts'. Its dominant features include scientific principles and statistical analytical approaches based on 'true facts'. Universality of findings is emphasized and knowledge is based on grand theories and master narratives grounded through processes of scientific measurement and rationalist thought.

According to Grbich (2007) weaknesses of positivism as a research paradigm include, difficulties of hypotheses verification including problems with analysis and replication of data over time. Knowledge is not limited to sense experience alone, other processes such as intuition and thought also contribute; how objective is objectivity. Tend to put overemphasis

on causal explanations and impose a particular world view without investigating, describing and understanding phenomena (*Ibid*). Lastly, there are limitations to more static view of rationalism, reason, order and logic compared to flexible theories of chaos and complexity[4].

Postpositivism

Postpositivism on the other hand, assumes that there is no objective knowledge independent of thinking. It views reality as socially embedded and existing within the mind (Grbich 2007). Such reality is changing and knowledge is constructed jointly by the researcher and the researched through consensus. Knowledge is subjectively constructed and based on shared signs and symbols recognized by members of a culture. Approaches research as exploration of the way people interpret and make sense of their experiences in the world in which they live and construct understandings from the context of events and situations and place them within specific social environments. Researchers' constructs are based on frames derived from their experiences *(Ibid).*

Postpositivism is therefore based on subjectivity (i.e. researchers' own views) and intersubjectivity (i.e. reconstructed views through interaction) ontology (Grbich, 2007: 9). However, this poses problem of intersubjectivity, how do we know our constructs represent the minds of other people? There is over-focus on the 'micro' as opposed to the 'macro' approach which produces superficial understanding of individual action (*Ibid*). Lastly, interpretive processes lack in depth exploration of the researcher and the researched. To understand how the researcher constructs knowledge could add value to the postpositivist paradigm. This is explored by postmodernism ontology.

[4] See Carol Gribch for more on contentious issues of positivism.

Postmodernism

Postmodernists view the world as complex and chaotic and reality as multiply constructed and transitional (Grbich 2007: 9). Postmodernists are sceptical about narratives, they views them as power-laden discourses. The search for reality is socially constructed and to understand the world it is essential to deconstruct the world and expose its constructions. Meaning rather than knowledge should be sought since knowledge is limited by desire and constrained by discourses developed to protect powerful interests (*Ibid*).

Postmodernists assert that truth is multifaceted and objectivity is paramount. They concentrate on mini-narratives in favour of descriptive documentation of specific processes, great focusing on individual interpretation with less focus on objective reality and truth perception of our life experiences. The postmodern researcher constantly undergoes reflective subjectivity of the situation under investigation and truth.

Reason and logic are seen as being constructed within particular societies and cultures providing specific cultural understandings (Grbich, 2007:10). They believe that realities are multiple and subject to endless formation, reformation, construction and reconstruction and all views are valid. However, postmodernism is known for nihilism (*Ibid*). Its deconstruction of discourses may lead to the collapse of knowledge, while rejection of objectivity and lack of certainty poses difficulty in theoretical framing leading to lack of solid conclusions.

Bringing it all together: a critical realist approach

In bringing all the above together, research in regime effectiveness analysis poses a complex and difficult situation in adapting specific research paradigm. To address this complexity a regime effectiveness researcher has to be pragmatic and sensitive to the aim and research questions of his/her study. Grbich (2007) asserts 'you can choose one paradigm which best reflects your research questions and preferred orientation, or choose to blend different paradigms' (*Ibid*: 14).

Each of the three paradigms offers crucial tenets to empirically analyze the context of regime effectiveness. However, they pose significant contentious issues which leave gaps that need to be filled by empirical researchers in international regime effectiveness analysis. This study contributes to fill these gaps by employing a critical realist's paradigm that 'knits' together the advantages of all three paradigms while taking care of respective weaknesses.

Critical realism seeks to explore a deeper reality than what we see or think (Sayer 2000). Its precept is shared in this study and therefore adopted as the paradigm to empirically evaluate international environmental regime effectiveness, as applied to transboundary water basin in Africa. Unlike modern positivists who hold that scientific methodology should have a logical and empirical content, the critical realists add a third component to scientific analysis, a characteristic content by describing mechanisms that play significant role in the observable patterns of events and properties of things (Grbich 2007: 5).

According to (Hare 1981: 4) the world is made determinate to human experience by acts of observation and categorization that impose structures and boundaries on the deliverance of

sense. This is qualified by the following two points. Firstly, 'the world is involved in the creation and experiencing of facts that allows for differentiation and separation from the experiential matrix of observable particulars of various kinds' (*Ibid*). Secondly, 'it functions to anticipate reality by carrying out conceptions beyond the empirically given' (Hare 1981: 5). To understand the world a research has to produce detailed answers to why, how, where, for whom the world acts the way it does, and what are the effects this shares with the post modernists' who see reason and logic as being constructed within particular societies and cultures providing specific cultural understandings (Grbich, 2007:10). They believe that realities are multiple and subject to endless formation, reformation, construction and reconstruction and all views are valid.

Critical realism qualifies such evaluation as it is a specific form of realism whose aim is to recognize the reality of the natural order, the events and discourses of the social world. It holds that, only when we identify the structures that generate those events and discourses at work, can we be able to understand and change the social world (Carlsson 2003: 12). Bhaskar (1989) asserted that 'these structures are not apparently observable patterns of events and can only be identified through practical and theoretical work of social sciences'. This is also shared by the positivists who view knowledge as being deduced from careful processes of hypothesising, variable identification and measurement within experimental designs. This results in identification of causality and allowing predictions to be made about 'facts'. Its dominant features include scientific principles and statistical analytical approaches based on 'true facts'. Universality of findings is emphasized and knowledge is based on grand theories and master narratives grounded through processes of scientific measurement and rationalist thought.

Kazi (2003: 24) asserted that critical realists believe there is a real world out there that exists independent of our knowledge, which can be subjected to logical, empirical and characteristic context analysis. This approach to research as exploration of the way people interpret and make sense of their experiences in the world in which they live and construct understandings from the context of events and situations and place them within specific social environments is shared by postpositivists. Researchers' constructs are based on frames derived from their experiences. How is this study grounded in the critical realism paradigm? The study aim as stated in Chapter 1: to describe, analyze and evaluate transboundary water regime effectiveness, demands a logical, empirical and characteristic approach to knowledge to be sought, thus take critical realist approach. It is an ideal research paradigm to explore the Lake Victoria Basin context that is complex with regard to signinificant influence of third parties, falling within the lake and the River Nile basin, settled by poor and multi-cultural population, and sparsely studied for transboundary water regime effectiveness analysis.

Also, the description of a phenomenon calls for its grounding in theoretical perspectives. Its analysis demands an analytic schema and an explanatory schema. It employs an explanatory schema under the critical realism based on multiple theories to explore facts related to theory. Multiple theories in social science explain phenomena operating at different levels in a hierarchical system (Hare 1986: 71-73). Theory is employed towards the end of the study to provide 'theory-after' reflections.

The epistemology

Epistemology literally defines the science or philosophy of knowledge. According to Blaikie (1993: 6-7), "it refers to the claims or assumptions made about the way in which it is possible

to gain knowledge of reality". As such, it provides the conditions or ways of acquiring knowledge to answer ontological questions raised. It is concerned with issues of degree of certainty we can legitimately claim from the conclusion drawn from an analysis. It is also concerned with the extent to which specific knowledge claims might be generalized beyond the immediate context of our observations. Lastly, it is also concerned with how we adjudicate and defend a preference between contending political explanations (Hay 2002: 63).

Various approaches have been employed to analyze regime effectiveness; they include: problem solving approach, process approach, legal approach, economic approach, normative approach and political approach (Young and Levy 1999: 4-5). In all these approaches the main goal of analysis has been to see whether the regime is set to achieve the goals it was meant to. This could be perceived as culmination of all the above approaches in attaining the goals of the regime. Regime effectiveness is synonymous to problem solving or goal attainment.

A comprehensive regime effectiveness analysis should therefore adapt the problem solving approach. Based on problem solving approach, effectiveness analysis has been the most widely used approach for reliability analysis in the initial stages of product/system development (*Ibid*). It is performed during the conceptual and initial design phases of the system in order to assure that all potential failure modes have been considered and the proper provisions have been made to eliminate failures. It has been used with high reliability to list the potential failures and identify the severity of their effects and provides historical documentation for future reference to aid in analysis of field failures and consideration of

design changes. It provides a basis for qualitative and quantitative reliability and availability analyses.

The empirical significance of critical realism was drawn by Manicas (1987) and Kazi (2003). Manicas asserted that, human observation is theory-laden and what is empirical depends upon our knowledge and perspectives unlike what is concrete and confirmed that there is difference between appearance and essence (Manicas 1987 and Kazi 2003: 23). Reality does not consist of simply experience and actual events, but rather constituted by structures, powers, mechanisms and tendencies underpinning, generating or facilitating actual events that may or may not be experienced (Kazi 2003: 23). A critical realist evaluator therefore is not satisfied with appearance, such as programme outcome, but seeks to investigate essence. An evaluator is not satisfied with findings of evaluation but seeks to develop new explanations and discoveries in order to develop deep understanding beyond appearance (*Ibid*). This is the essence of regime effectiveness analysis pursued by this study.

Critical realist epistemology explores structures and elements that exist in relation to how interventions interact with other elements within stratified reality to understand functionality and effectiveness (Kazi 2003: 23-24). The dynamism in states' political, social and economic factors, coupled with environmental changes, pose complex scenarios in analyzing how effective international environmental regimes are in solving issue-specific problems among state partners. Similar dynamism is depicted in norm and rule creation during regime evolution, revealing how regime effectiveness analysis should be a continuous process. Situations and environments in which programmes operate are continuously changing and have to respond to these changes. The defining features of society are its morphogenetic

nature: its capacity to change its shape or form (Lawson 1998: 195). This has to be considered in empirical conceptualization of international regime effectiveness.

As stated in Chapter 1, this study focuses on systematic hierarchical analysis of effects on transboundary water regimes to solve intended problems. It involves multi-objective or multi-criteria analysis of cause-and-effects mechanisms of regimes. Context analysis of cause-and-effect mechanisms can be used to complement conclusions on whether a regime is effective or not. An analytic schema (e.g. RALP Model) generates system or hierarchical data sets. These data sets have complex causal structures demanding causal knowledge built into them to be revealed through analysis. Lawson (1998: 156) argues 'it is not very helpful to cover phenomena under generalizations but to identify factors responsible for it that helped produce it or at least facilitated it'. As such, Layder (1993) and Kazi (2003: 24) emphasized that, the crucial part of a critical realist evaluation is in identification and investigation of causal mechanisms. Kazi (2003) defined a causal mechanism as "a stratified or layered framework of human action and social organization". Such a framework is made up of macro phenomena i.e. structural and institutional; as well as micro phenomena i.e. behaviour and interactions (Layder 1993). The following section explains the study design reflections that explore both phenomena.

The design reflections

The analysis of regime effectiveness cannot be attained in isolation, but rather, explained in the sense of causal mechanisms embedded in the context of pre-existing historical, economic, cultural, social and other conditions (Kazi 2003: 24). Such analysis can be done through constructive causal explanation involving investigations into causal factors

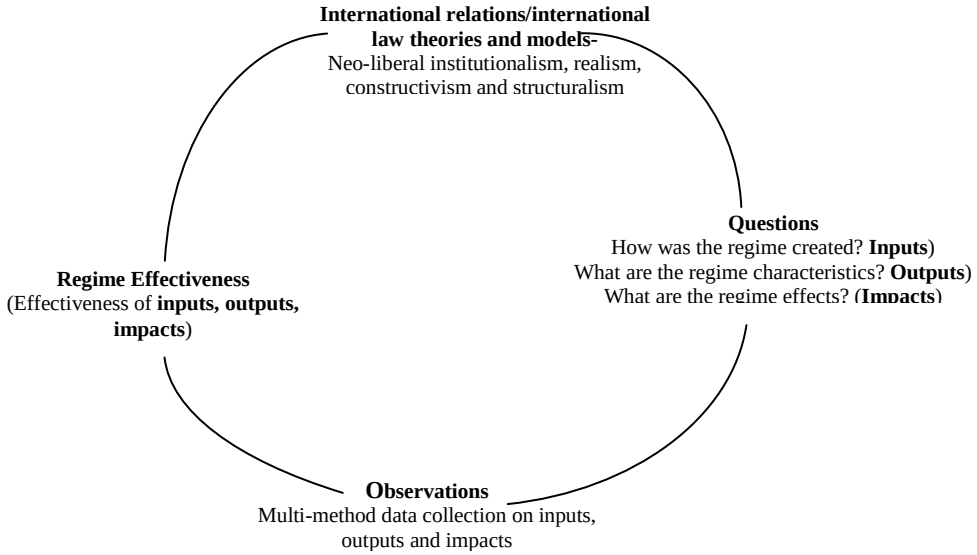
differentially arising in the production of a phenomenon (i.e. “differential inference”), so that the effect of each ‘active ingredient’ are identified (*Ibid*).

Drawing from the ‘mechanism, context, and theory approach’ (Pawson &Tilley 1997; Kazi 2003**),** this thesis draws a research design to analyze regime effectiveness in Lake Victoria Basin of East Africa. Based on the RALP model, it integrates process-outcome evaluations within levels, and builds them across the levels as a process. Its major reflections in regime effectiveness analysis follow the evolution structure of the regime. The study design is an integrative process explaining how outcomes from each regime level (inputs, outputs and impacts) influence the outcome of subsequent level and the effect of the whole regime. As Hay (2002: 88) argued that:

> “as soon as we move from the realm of mere description to that of explanation we move from the realm of science to that of interpretation. In this realm there are no privileged vantage-points, merely the conflict between alternative and competing narratives premised on different ontological, ethical and normative assumptions. To take seriously the ethical responsibility that comes with an acknowledgement that epistemology cannot adjudicate political claims is then to insist on three things: (i) that political analysis remains essentially political and refuses to abandon its ability to think of a world different from our own simply because such claims cannot be adjudicated with ultimate certainty; (ii) that it seeks to acknowledge its necessarily normative content; (iii) that it strives to render as explicit as possible the normative and ethical assumptions on which it is premised”.

Hence, the above assumptions by Hay would help understand the substance of current governance systems and maps out the terrain for prescriptive regime effectiveness analysis. Figure 1 is an illustration of this study design under the critical realism paradigm.

Figure 3.1 Critical realist transboundary water regime effectiveness Analysis cycle



Source: Modified from Pawson &Tilley 1997; and Kazi (2003).

The methodology

The word method means a "going after" or a "pursuit". In science method refers to a pursuit of knowledge (Punch 2005). However, the word method shares its etymological roots. It is made up of the root word *meta* and *hodos*: *meta* means "from or after" and *hodos* "journey" (*Ibid*). The term method literally refers to the procedure or the detailed and logically ordered plan used to go after knowledge (Cresswell 1994). Methodology adds to the root word *logos*: referring to the principle of reason, the source of world order and intelligibility (*Ibid*). The suffix *–ology* retains some of this meaning and when combined with method, gives the term which denotes a study of the plans which are used to obtain knowledge. Methodology is thus

the examination of the possible plans to be carried out i.e. the journey to be taken so that an understanding of phenomenon can be obtained (*Ibid*).

Methodology literally relates to the choice of an analytical strategy and research design. Blaiekies (1996: 7) defined methodology "as the analysis of how research should or does proceed". However, the misuse of methods and methodology is common. Hay (2002:63) asserted that:

> "... *methodology* establishes the principles which might guide the choice of *method*, it should not be confused with methods and techniques of research themselves.... methodology is best understood as the means by which we reflect upon the methods appropriate to realise fully our potential to acquire knowledge of that which exists".

In recent years, however, methodology has been increasingly used as pretentious substitute for methods. This therefore requires one to be clear on the use of the words 'methodology' and 'methods'. Methodology is the branch of logic that deals with the general principles of ordered plan to 'after knowledge'. It is defined as the analysis of the principles of methods, rules and postulates employed by a discipline; the systematic study of methods that are, can be or have been applied within a discipline or a particular procedure or set of procedures' (Creswell 1998: 2003). In this study methodology refers to the logical plans employed to 'after knowledge'. Methods relates to the means or manner of procedure, a regular and systematic way of acquiring knowledge, or orderly arrangement of steps to acquire knowledge.

Regime effectiveness studies seek to understand whether regimes matter in solving the problem they were intended by employing methodologies such as: single-outcome studies or comparative case studies. Single-outcome studies may be viewed from three angles: nested analysis- large-N cross case analysis; most-similar analysis- small-N cross-case analysis; and within-case analysis: evidence drawn from a case of special interest (*Ibid*). Usually, regime effectiveness analysis has been based on a cross-section of cases, until recently when interests shifted to causal factors that lead to specific regime consequences.

Gerring (2007: 190) observed that, "every phenomenon in which a substantial number of people care about, inspires its own single-outcome research agenda". However, he asserted that to interrogate for within-case evidence one has to work hard to define and operationalize what she/he is trying to explain, this involves laying more nuanced indicators of the phenomenon (Gerring, 2007: 193). It involves a clear indication of causal factors of interest, specification of outcomes and alternatives, and a causal factor or factors thought to be responsible for the (imagined) variations across the outcomes (*Ibid*: 194). Such single-case studies seek to know almost everything in the case to develop a more or less "complete" explanation of outcomes, including all causes that may contribute to it (*Ibid*: 195). The following section explores the horizon for methods that can fulfil a within-case analysis.

The methods for transboundary water regimes effectiveness analysis

According to Young (1992: 163) models and methods for analyzing regime effectiveness have grown more sophisticated over the years. They have evolved from qualitative analysis i.e. from case studies to historical process-tracing, to quantitative analysis. As such, works by scholars have remained varied (Hejny 2008: 13).

Underdal (1992: 2002) made integral contributions by situating regime effectiveness analysis in systematic step-by-step approach and by identifying specific standards: non-regime standard, as no regime; and the collective optimum, as a fully operationalized and acceptable regime (Underdal, 1992: 231). Hejny (2008) observed that these standards suffer from inherent conceptual challenges, particularly, in determining the standards themselves. Bernauer (1998: 368) among other scholars have rejected the concept of 'collective optimum' saying its determination is controversial as it is subject to the problem of 'endogeneity': a loop of causality between the independent and dependent variables in the model.

Other scholars have used 'compliance' as a standard against which to measure impacts of regimes. Hejny (2008: 15) observed that compliance is problematic to evaluate. Bernauer (1998:359) argued that, compliance assessment uses rules of institutions to explore compliance, instead of goals as standards of measure. Such assessments do not reveal effects of the regime. Henjy (2008) warned that one has to be careful in using institutional goals, as poorly defined goals will lead to irrelevant measure of regime effectiveness.

Other evaluations include the following. Breitmeier, Zurn and Young (2007) developed a regime analysis database based on case studies. Mitchell (2003); Young and Levy (1999); Underdal (1992); Miles and others (2002), have used case studies to analyze regime effectiveness. Haas, Keohane and Levy (1993) used context analysis (the Three Cs). Victor and Raustiala's (1998) Systems of Implementation Reviews (SIRs). Steinberg (1998) used Historical process tracing; and Hejny (2008) proposed the One-Step at a time approach to

regime effectiveness analysis. However, these approaches sparsely employ cause-and-effect analysis of mechanism involved.

An earlier method related to the Hejny's (2008) One-step at a time approach is regime analysis (Hinloopen *et al.* 1983, and Nijkamp *et a.l* 1990). Regime analysis is "a descrete multiple criteria method known for its flexibility in assessing projects as well as policies, and its capacity to analyze quantitative as well as ordinal data" (Nijkamp et al. 1998). Whereas recent analyses have shown how regimes correlate with particular environmental and social outcomes, they have not directly accounted for causal relationships between the regime and change in outcome (Benner and Coglianese 2004: 12). It is for that matter that Mitchell (2002a) called on researchers to use state-of-art methods to isolate effects of specific regimes.

Chaube (1992) applied a multilevel hierarchical modelling approach to analyze regime creation in international river basin in the India-Bangladesh-Nepal-Bhutan for conflict management. The approach used existing models and institutional frameworks. By breaking the problem into hierarchical stages, robust analysis of physical, political, economic and institutional systems was possible.

Chaube based his study on a static framework (Dinar *et al.* 2006:29). Drawing from Chaube, Deshan (1995) applied a large-system hierarchical dynamic programme model to a case of Yellow River in China. By incorporating intertemporal effects, it allowed for testing for likely future impacts of scenarios. Deshan observed that building intertemporal effect into

regional framework offered a careful evaluation of potential regime creation arrangements as well (*Ibid*).

However, it is difficult to fit one method that meets all critical realist requirements for effectiveness analysis. Regime effectiveness analysis is a complex phenomenon and may not be fully realised under one methodology. Whereas many studies have used combinations of methods to study complex social and political phenomena, this is rare for regime effectiveness analysis. Such methods combinations use postcolonial concepts such as – 'hybridity' and 'border crossing' (Taylor 2008:881). As such, a 'hybrid' of methods is adopted to address the study design and seek answers to the study questions. Hybrid research methodologies are ideal for exploration and interventions aimed at improving social context in local conditions (Taylor 2008: 887). This thesis applies a 'hybrid' of methods to specific analyses of regime effects in the Lake Victoria Basin. The following section considers the of methods toolbox.

Box 3.1 The methods toolbox

1. Case studies
2. Regime analysis method
3. Analytical Hierarchy Process (AHP) method
4. Data collection methods
    a. Interviews
    b. Document analysis
5. Data analysis methods
    a. Interview /document textual analysis
    b. The method of subobjectives (decomposition)
        i. The causal proximity
    c. The *modus operandi* method
        i. Physical causal reasoning
    d. Expert Choice method

Case studies

As noted earlier, case-study is such one available method for within-case analysis methodology. A case study is a holistic inquiry that investigates contemporary *phenomenon* within its *natural setting* (Harling 2002: 1). It specifies particular terms in detail: *phenomenon* can be many different things, a program, an event, an activity, a problem or an individual (Gerring 2007: 33). *Natural setting* is the context within which the phenomenon appears. Context is included in case studies because contextual conditions are considered highly pertinent to the phenomenon being studied (*Ibid*). Phenomenon and natural setting are bound system and their boundaries are set in terms of time, place, events and processes (*Ibid*). A holistic case study inquiry involves collection of in-depth and detailed data that are rich in the context and involve multiple sources of information including observations, interviews, audio-visual material, documents, reports and physical artefacts. These sources of provide the wide array of information needed to provide an in-depth picture (Harling, 2002: 2; Stake 2005: 447).

Yin (1994) identified four applications of a case study method. Firstly, it can be used to explain complex causal links in real-life interventions. Secondly, it describes the real life context in which the intervention occur; thirdly, it describes the intervention itself. Lastly, case study method explores those situations in which interventions evaluated have no clear set of outcomes.

Case study method has been used to identify and substantiate causal claims about international institutions (Haas, Keohane and Levy 1993; Stokke and Vidas 1996; and Young 1999). For example, Young (1999) directed a project where theoretical models were assessed

for their relevance and relative importance under real world conditions through case studies. Keohane and associates conducted causal analysis around concrete mechanisms around which regimes can alter behaviour of state actors and in turn improve environmental quality (Keohane, Haas and Levy, 1993: 19).

However, (Stokke 2003: 3) argued that, case study research has to bring finer details of how particular outcomes came about especially in regime studies. (Young 2004:1) observed that, most analyses focus on multiple case studies and seek to assess performance of regimes on a case-by-case basis. Gerring (2007: 27) argued that, such studies have considered single case variation over time (diachronic analysis) or within case variations at a single point in time (Synchronic analysis). However, Young (2004: 1) observed that, synchronic analyses are rare in regime effectiveness analysis.

There are criticisms against the use of case study method in general (Gerring 2007; Harling 2002). These include the following. Firstly, there are weaknesses in generalizability (Gerring 2007). Opponents of case study argue that data generated from single case study cannot provide a basis for generalization (*Ibid*). Others argue theory can be absent from studies that focus on describing the case and its issues (Yin 1995). However, Cresswell (1994) argued that theory can be employed towards the end of the study to provide a theory-after perspective. However, case study approach is essentially an *artistic* process (Willard Waller 1934; Gerring 2007).

Case study selection criteria, description and justification

According to Mitchell and Bernauer (1998: 8) selection of a case study that seeks to identify valid causal relations should be grounded in extant theory. Whereas case study research is not a sampling research, it must consider availability of time and other resources (Gerring 2007; Yin (1995); Stake (1995); Feagin, *et al.* 1991). Many case studies use multiple case study design, with some 'idiographic' or single case study also common (Gerring, 2007: 188). Gerring 2007:189 indicated within-case studies shed understanding on "a cause and a cause in fact".

The case study selection criterion for this thesis is based on the *fit for purpose criterion.* The Lake Victoria Basin, East Africa is selected to shed light on the general effects of transboundary water regimes in Africa. Although some water regime formation and effectiveness studies have been done in the southern Africa region bases on transboundary river basins (e.g. Linderman 2005), there are barely any cases from eastern Africa region based on transboundary lake basins.

The Lake Victoria basin forms an ideal case because of its geostrategic positioning, socioeconomic/sustainable development significance, and degree of environmental degradation threats (Abila et. el., 2006). The basin and the lake are threatened by vast environmental degradation which as a result threatens a population of over 35million people (*Ibid*). The main players are the riparian states: Kenya, Uganda and Tanzania. It has other global relevancy as observed in Chapter 1. However, regime effectiveness analysis studies on the basin and/or other resources in the continent have hardly been done if any. The Lake Victoria Basin forms an ideal case study for international regime effectiveness analysis.

This study adopts within-case study approach to analyze regime effectiveness in the Lake Victoria basin. It employs the RALP model outlined in Chapter 1 (Figure 1) and Chapter 2, where regime is disaggregated into four stages suspected to be influencing behaviour change in the basin. Key elements of global/international water and environmental management and regional contexts are isolated and how these interact to induce their effects at the programme level, synthesized and judged. However as observed in Chapter 1, this study conducts a partial regime effectiveness analysis by narrowing down to three levels and adopts a single-outcome within-case investigation.

The regime analysis method

Regime analysis method is 'a discrete multiple criteria method suitable due to its flexibility in assessing projects as well as policies' (Njemp *et al.* 1998:14). Chapters 1 and 2 showed how regime analysis as a continuous multiple criteria method. As a multi-criteria method, its fundamental framework is based on evaluation matrix and a set of political weights (*Ibid*). The evaluation matrix is composed of elements which measure the effects of each subobjective of the regime in relation to each considered criteria (*Ibid*). The set of weights give information concerning the relative importance of each criterion we want to examine (*Ibid*).

The strength of regime analysis is in its ability to deal with binary, ordinal, categorical and cardinal ratio or interval data, while it is also possible to use mixed data (*Ibid*). This applies to both the effects and the weights in the policy analysis. Unlike the regime analysis defined

by Njemp and others (1998), where alternatives are compared in relation to all the criteria in order to define the concordance index: defined as the sum of weights of the chosen alternative in a concordance set, regime effectiveness analysis is a dynamic hierarchical analysis of the various regime subobjectives in relation to all the criteria to define desired targets (Hejny 2008). As such, it relates to the logic of governance stated in Chapter 1.

Analytical Hierarchy Process methodology

Analytic hierarchy Process (AHP) is a multi-criteria analysis technique that provides an appropriate tool to accommodate conflicting views (Saaty 1990). It is an effective tool for eliciting expert knowledge and for development of expert systems in natural resources management (Barrett 2005). It is applied to many and diverse areas of decision-support, with respect to natural resources management and environmental management (Dinar *et al.* 2006) and to rank or weigh environmental, social and economic objectives of policy options in a small watershed. It allows analysts to model a complex regime in hierarchical structure showing the relationships of the problem identification process for regime creation, the characteristics of the regime, the implementation and the impacts of the regime. AHP enables regime analysts to derive priority actions weights as opposed to arbitrary assigning them, thus helping to structure and exercise judgements on impacts towards attaining regime goals both objectively and subjectively. Basically AHP is based on three principles: decomposition, comparative judgements and hierarchical composition or synthesis of priorities.

This study finds AHP methodology useful for analyzing the effectiveness of transboundary water regimes. By employing the decomposition principle of AHP, transboundary water

regime to its subobjectives to draw inferences for effectiveness analysis. It is decomposed into inputs, outputs, outcomes, impacts (Box 1 Chapter 1). These subobjectives are then decomposed to their generic elements (see Subobjectives methods). It is the generic elements that are subjected under comparative judgements.

Saaty (1990) demonstrated the feasibility of expressing the importance of generic elements or components relative to one another with respect to attaining a given criterion. In this comparison, experts' judgement concerning the components is elicited using a pair-wise comparison method in relation to attaining the level goal, e.g. effective regime creation. The expert; through acquired knowledge, has to judge which component is more important, alternatively a participatory appraisal approach could be very conducive. AHP gives priority weights to the hierarchy components of the regime. There are a number of methods one could use to determine the relative score of the components. The initial approach was through utilizing the AHP relative importance scale developed by Saaty (1990) (see Table 1), this study uses *Expert Choice 11.5*[5] software for comparative judgements (Yuan-feng Wen 2009; Muller and Fairlie-Clarke 2001). By extending the criteria of regime analysis method to the AHP methodology, the Regime Analytic Levels Process Model is identifies as a tool for analyzing effectiveness of international/transboundary water regimes.

Table 3.1 Example of AHP relative importance scale

Scale	Definition
1	As good as
3	Marginally better
5	Much better
7	A lot better
9	Extremely better
2,4,6,8	Intermediate values

Source: Saaty 1990

[5] http://www.expertchoice.com/

The observer, for example, states how much better component A is compared to component B in level 1 of the hierarchy. The same could be done for subcomponents within a level to derive the value of a component. As AHP is a pair-wise comparison method, the components to be weighed are determined, two at a time in, against the level relative goal. For each determined pair the weights are presented in a matrix form. For every weight given to any pair of components 'A vs. B', the 'B vs. A' comparison takes the reciprocal value. This results in a diagonal matrix. Similar matrices can be completed for all the levels in the regime hierarchy. Each matrix can be computed for the principle right eigen vector. This vector gives the normalised weights for all the components. This could be used to indicate the degree of correlation between individual component effects and their parent level. Using Expert Choice software verbal judgements can be quite accurately estimated.

Data Collection

Data collection is the approach to systematic gathering of information about our objects of study (people, objects, phenomena) and about the setting in which they occur (Corlie et al., 2003). Data collection in a case study is done through sampling: the procedure a researcher uses to gather people, places or things to study (Schutt 2007: 302). There are two categories of sampling approaches: probability sampling methods (those that allow us to know in advance how likely it is that any element of population will be selected for the sample) and nonprobability sampling methods: those that do not let us know in advance the likelihood of selecting each element (Schutt, 2007: 140). Purposive sampling strategy is utilized, where the researcher targets a group of organizations or people believed to be typical or average or a group of people specifically picked for some unique purpose. Purposive sampling may involve selection of key informants; people particularly knowledgeable about the issue under

investigation (*Ibid*: 155). Case studies employ qualitative methods for data collection such as interviews, secondary data (documentary analysis) and observations (See Box 1).

Primary data in regime effectiveness analysis, especially in international shared water resources is characterized by gaps of missing data, poor accuracy of data, incompleteness and unreliability. This is because this data is based on experiences of experts involved in the management of these resources. It is also based on historical process tracing mainly dependent on personal experiences of experts. Under normal field conditions experts are not readily available or some of them are dead or are retired. Other aspects complicating primary data acquisition is the lack of databases in regional set-ups. This is also complicated by the fast evolution in creation and merging of institutions. Institutions formed with backing of donor support tend to be put in key ministries in governments but when the funding stops they are either closed or merged with other institutions in non-key ministries. This affects storage of key reports and other documentation. However, there are common strategies that must employed to collect primary data. These include formal or informal interviews using structured or open ended questionnaire, photographs, focus group discussions, and observations, both participant and non-participant observations. This study uses interviews.

Interviews

Interviewing is a qualitative method of finding out about people's experiences, thoughts and feelings (Robson 2002:159) There are various categories of interviews based on the degree of structure used namely: semi-structured and structured interviews (Bryman 2004: 320). Structured interviews tend to have a set of questions that the researcher wants answers from, while semi-structured interviews tend to have far more that interviewee's point of view

(*Ibid*). The semi-structured interviews require more time to analyze and tend to be biased due to poorly constructed questions (Bryman 2004: 319).

There are three groups of approaches to interviews, namely: elite interviews, key informants interviews and surveys (*Ibid*). Elite interview focus on people who have conducted research or have acted as consultants in some aspects of the issue or phenomenon focused by this study. Key informants are those people who might have participated in the creation of the program. As Patton (1987: 95), argued that, "at any stage of fieldwork key informants can be an important source of information."These may include retired officers of community members who have firsthand understanding and good memory of the creation of the program. In most cases key informants serve as a source of information the researcher has or cannot experience, as well as things not actually witnessed. The weakness with key informant interviews is distortion and bias. "Data obtained from key informant interviews, present perceptions, not truths" (*Ibid*). See Research Question 1 below for further details on elite interviews.

Document Analysis

Data analysis consists of examining, categorizing, tabulating, or otherwise recombining evidence to address the propositions of study (Yin 1994). Data analysis in case study is the least developed aspect of the case study methodology. Researchers rely on experience and literature to represent evidence in various ways, using various interpretations. However, this is necessary especially where statistical analysis is not possible or necessary. Wherever possible, statistical tests help in the presentation of data to the reader. Miles and Huberman (1984) suggested that one needs to suggest alternative analytical technique where case studies

do not lend themselves to statistical analysis. Such techniques may include use of arrays to display the data, creating displays, tabulating frequencies, ordering information etc. However, it is important for every investigation to have a general analytic strategy as a guide regarding what is to be analyzed and for what reason (Yin 1994). Most possible analytic techniques could include: pattern matching, explanation–building and time-series analysis as guided by the theoretical proposition that led to the case study (*Ibid*). See Research Question 2 below for further details.

Data analysis

Basically, primary data analysis involves continuous examination, identifying for important points, common themes. This could be done manually or using computer based packages. The analysis of secondary data for international regime analysis involves mainly documentary analysis. Regime creation and implementation activities are reported in the form of treaty documents and implementation reports. In case of non-written agreements, narratives have been recorded and transcribed into reports from earlier studies as explanations on how some cooperation emerged. Treaty documents are very crucial as they contain so much detail about the partners to the treaty, the norms, principles and rules, including dates they entered into force.

In secondary data analysis reports of activities involved in problem identification and creation are analyzed. It is these agreements or reports could be analyzed for processes of creation of norms, principles and rules. Implementation and monitoring reports serve as an important source of information in secondary data analysis as they give temporal dimension of study variables. Secondary data analysis is done through simple descriptive analysis involving

pattern matching, explanation–building and time-line matrices analysis etc. Through these causal mechanisms could be constructed that are used in tertiary or inferential data analysis.

Various approaches have been used for tertiary or inferential data analysis. Common among multivariate analysis approaches are Analytical Hierarchy process (AHP) (Saaty 1965), Analytical Network Process (ANP) (Saaty 2001), Simple Multi-attribute Rating Technique (SMART) (Edwards 1971), PROMITHEE I/II (Brans et al., 1986) and ELECRE III (Roy, 1968), that explore correlation and cause and effect relationships (Quresh and Harrison 2003). This study uses AHP as observed earlier. To analyze the resultant RALP model (Ch.1) derived through Analytic Hierarchy Process (AHP), this study uses the decomposition principle or the method of subobjectives (Mohr 1995: 249-259) and the synthesis principle or the "modus operandi method" (Scriven 1976) which employs the physical causal reasoning approach to determine cause-and-effect.

This study employs the following five criteria for inferential analysis. First, empirical association: identifying whether the observed outputs are a product of the inputs and whether observed impacts are derived from the outputs. The evaluation of process-outcome through empirical association criterion is significant step in determining subobjectives and in the evaluation of causal importance. This is an appropriate criterion for establishing cause-and-effect for regime effectiveness; however, it is not sufficient. The second criterion is appropriate time order. It establishes or ensures that the variations in the outcomes occurred after the variation in the process across the evolutionary levels of inputs, outputs, outcomes and impacts. A good research design has the ability to determine time order. Through evaluation of time order, some physical causal reasoning among subobjectives, processes and

outcomes can be established. The third criterion is nonspruciousness. This is essential in establishing cause-and-effect. It is the most important criteria in regime effectiveness analysis as it establishes whether relationships between the processes and outcomes are not due to variation in other elements within the levels. Through statistical control, i.e. holding constant values of one variable, the risk of spuriousness is reduced (*Ibid*). It is in this criterion that causation is established through physical causal reasoning. The other criteria employed include identification of causal mechanisms and specifying the context in which the effects occur (Schutts, 2007). These criteria are addressed here through the following methods.

Textual analysis

Yin (2002) highlighted the use textual or documentary analysis in case-study research. Finnegan (1996) asserted that, primary documentation sources are the original materials that provide researchers with raw research data, unlike secondary sources that have data already subjected to interpretation. As such, interviews are transcribed and analyzed.

George and Bennett (2005: 100) argued that the use of archival documentation calls for evidence of documentation and accuracy of information. Such textual research encompasses collection a huge and heterogeneous range of potential textual sources of information, including personal documents, official, state, regional or international documents, private documents, mass media outputs and visual outputs such as internet resources (Bryman, 2004: 380). Textual data has been used in conjunction with other methods to aid in triangulation of data from other sources (Punch, 2005: 184).

The method of subobjectives

A subobjective is an outcome to be achieved before and/or in order to achieve a further outcome (Mohr 1995: 31). Subobjectives can be used to lend strength and confidence to inferences about impacts and permit modelling of a causal process so that causal proximity may help validate treatment inferences" (Mohr 1995: 32). Subobjectives are identified between actions and effects, or between outputs and outcomes to validate the theory linking them. Causal proximity and size of impacts are information that may increase confidence (*Ibid*). The method of subobjectives is a means to know how a weak regime or programme can be made stronger or an effective regime even more effective, or more efficient (*Ibid*). However, its use is extremely rare (*Ibid*).

The modus operandi method

Impact analysis deals with causation. While causal analysis in quantitative analysis relies on the counterfactual hypotheses this is not the case causal inference in qualitative analysis (Mohr 1995). The *modus operandi* method: a method of establishing the most operative reason i.e. causation, is employed. Different causes of subobjectives are assumed to have their 'signatures', a known mechanism or causal chain by which one subobjective leads to another. For example, while a known mechanism, 'the signature' may be confirmed to be linking two subobjectives in a given regime level, other additional signatures may be doing the same through other mechanisms (Mohr 1995: 262). The task of the analyst is to show which signature actually linked the two subobjectives and which ones did not. Through physical causal reasoning, "a relation between events in the natural world", the operative reason is established (Mohr 1995: 263). Mohr (1995: 262-283) asserts:

> "physical causation is of great importance in impact analysis for two reasons. The first is that it underpins the notion of factual causation; without it, the definition of factual causation (which is essentially the counterfactual definition) would be crippled by problems. The second is that it generates a form of reasoning about causality-physical causal reasoning-that can be used to infer causation by means of qualitative research. This basis of determining causality is relied upon heavily in many areas, such as detective work, cause-of-death determination, medical diagnosis, and troubleshooting in connection with machinery, as in auto repairs."

Cause-and-effect analysis is employed here to evaluate regime impacts. It is done by considering two factors: First, the 'dependence' of observable indicators (Steinberg 2007) on regime characteristics. This involves evaluating the necessity of regime sub-objectives in causing observable changes, and their sufficiency in causing the change i.e. the capacity of a regime characteristic to produce the effect in situations where the effect is in absence. Second, it considers the 'sustenance' (*Ibid*) of regime characteristics in causing the observed impacts. By employing the disaggregation and synthesis principles, causations of regime characteristics are identified to account for regime impacts.

Physical causal reasoning is employed here to determine the cause-and-effect mechanisms of substantive and procedural characteristics. Mohr (1995) establishes that,

> *"It is plain that physical causal reasoning may be as persuasive a method of establishing causation in impact analyses." (Mohr 1995: 270)*

According to Mohr (1995), reasons are assumed to be causes of intentional behaviour. Reasons and their strength are assumed to be entities of an unaware physiological system, therefore not part of anyone's thoughts (Borge 2007). "Operative reasons are therefore physical causes" (*Ibid*). Based on this understanding, this impact analysis is complemented by physical causal reasoning through looking for physical mechanisms linking state of the ecosystem connectedness and its management. The established outcomes of joint management are ranked for their significance to holistic integrated environmental management, while those of the precautionary approach are ranked for causal importance to problem solving by measuring for their leverage, attribution and covariance (Steinberg 2007).

Expert Choice method

Expert Choice (Dyer *et al.* 1988) is a pairwise comparison process that enables analyst to derive ratio scale priorities or weights as opposed to arbitrarily assigning them as in AHP approach indicated above. They can be performed using words, numbers or graphical bars, and typically incorporate redundancy, which results in a reduction of measurement error as well as producing a measure of consistency of the comparison judgements. Using Expert Choice software enable decisions are made using the principles of AHP described earlier. Next, the principle of comparative judgements is used to produce pairwise relative comparisons of these generic elements. It is from these themes and patterns that the creation of the Lake Victoria Basin regime is constructed based on problem factors and negotiation process factors. These results are reported in Chapter Four.

Analyzing regime effectiveness in the Lake Victoria Basin

The regime creation or input level in the Africa context consists of internal and external factors. The external factors consist mainly of global influences in the form of water and environmental related conventions, treaties, protocols and programmes of international organizations. These politico-legal arrangements influence creation and effectiveness of environmental regimes in one way or the other within the basin.

Prominent in transboundary water governance in Africa include the 1966 Helsinki rules, the 1969 Africa Convention on Conservation of nature and natural resources, the 1971 Ramsar Convention, the 1972 Stockholm conference, the Agenda 21, the 1992 & 1997 UN Water Convention and The Convention on Conservation of Biodiversity. Many of these, if not all have in one way or the other influenced the creation of regional treaties, regional programme goals and/including national policies and laws. At the regional level the study considers internal factors such as problem and process factors that have influenced the creation of regional treaties and protocols on sustainable water basin management. At the programme level, this study analyzes the goals of the Lake Victoria Environmental Management Programme (LVEMP), how they were arrived at and implemented. Finally, it considers impact of the implementation of programme goals at the pilot zones.

In this study a cross-sectional approach to data collection is used. The data is collected through a four months fieldwork. The field refers to the transboundary water legal set-up and personnel within the East Africa Community involved in management of the Lake Victoria Basin. The key units of analysis were, firstly elite people involved in creation and working within transboundary water management of the Lake Victoria basin (particularly with

LVEMP). Secondly, treaties, conventions, and agreements documents, and archival records of meetings, proceedings and reports were collected and analyzed. The unit of analysis was The Lake Victoria Basin environmental management progamme (LVEMP). These are further explored in respective research questions.

Question1: How is transboundary environmental regime in the Lake Victoria basin created?

This question is answered by investigating organization of collective action to create environmental regimes in the basin. Its basic objective is to establish how fundamental values were incorporated and how fair was the process to attain intended regime goals. The basic approach to collecting data was through interviews of key informants or key actors and documentary analysis. Steinberg (2004: 8) observed that documentary analysis sporadically reports event-manifestation of past and ongoing processes. As such they rarely provide a good account of the origins and impacts of events or the links among them. He asserted that interviews were often "the best, and sometimes the only information source for detailed insights into causal mechanisms" (*Ibid*).

Interviews were conducted on key informants, mainly government and LVEMP project officials in Kenya, Uganda and Tanzania to reveal how the basin regime was created. The question sought to find key information on processes of organization of collective action (input): including problem factors (problem identification, conceptualization, contextualization and problem solving), and process factors (agenda setting, negotiation process, signing of agreements) to eventual implememtation of LVEMP.

The goal of the interviews was to understand how effectiveness was the collective action that addressed the environmental problem of the basin. The regime creation process was decomposed into two main subobjectives: the problem factors and process factors. The problem factors are further decomposed to generic elements, namely: problem identification, problem conceptualization, problem contextualization, and problem pressure. Process factors are decomposed the following generic elements, namely: agenda-setting, negotiations, and signing of agreements. Through analysis of transcripts and documents, important themes and patterns in the organization of collective action for problem factors and process factors are identified. See Box 3.1 for a summary of subobjectives on regime creation.

Box 3.1 Summary of subobjectives on regime creation in the Lake Victoria Basin

Problem factors

1. Problem identification
2. Problem conceptualization
3. Problem contextualization
4. Problem Pressure

Process factors

1. Agenda setting
2. Negotiations
3. Signing of Agreements

The rationale of the elite interviews was firstly, to gather information from a sample of officials in order to make generalizable claims about their decisions on the above parameters of collective action for regime creation. Secondly, was to discover particular pieces of information or getting hold of particular documents. Thirdly, was to inform or guide the researcher to other respondents or more data (see Goldstein 2002: 669). Key informants for

the interviews were identified from an initial international conference on Groundwater and Climate Change held in Uganda (Kampala, 23 June - 4th July 2008), one of basin states. Richards (2001) described key informants as a group of individuals who hold or have held significant positions in society or organizations. They therefore provide a potential source of data unavailable from other sources to the researcher. The notion of key informants in this study was understood as those government representatives who were involved in the creation and initial set-up of the phase 1 of LVEMP.

Key individuals were identified through informal interaction during the international conference and by specific 'snowball' or 'referral' strategy (Burnham *et al.* 2004: 207). About 40 names were identified during the interactions in the conference with some names present and others not, this formed the sample frame of interviewee. The names formed a representative sample as efforts were made to get officials from all the basin states. Getting this representative sample was not very difficult as key players in the creation of LVEMP were well known in the basin and a list of these officials was easily developed through contacts with LVEMP secretariats and documents. The interview protocol employed an open-ended questionnaire to elicit inform on the abpve aspects of collective action for regime creation in the basin. During the interviews respondents were asked if they could help to name and contact other key players and officials involved in the creation of the Lake Victoria regime (i.e. the 'snowball' or 'referral' strategy). Only one respondent could not be interviewed due to bureaucratic reasons.

Question 2: What is the regime architecture or output(s)?

This question explores the attributes of the regime (see Breitmeier *et al*. 1996). Its basic objective is to ascertain effectiveness as transfer of authority in the basin through regime architecture. It asks for data on principle regulative, procedural and programmatic elements (*Ibid*). These attributes are divided into two categories, namely the substantive (principle regulatory) characteristics and procedural characteristics (the procedural and programmatic elements) normally making up the treaties, conventions, protocols, declarations, programmes, strategic action plans, and project objectives. The main substantive characteristics for analysis include the norms, principles, and rules while the main procedural characteristics include procedural principles, procedure, practice and organization (See chapter 2). Box 3.2 gives a summary of the main instruments for regime architecture analysis.

Box 3.2 Summary of main instruments for regime architecture analysis in the Lake Victoria Basin

1. The APTEMAP	2. The EAC Treaty: Chapter 19
3. The LV Protocol	4. The ACCNNR
5. UN Water Convention 1992/1997	6. Agenda 21: Chapter 18

Breitmeier and colleagues (1996) observe that regime analysts use data on regime architecture to assess the performance and evolution of regimes. “Policy-makers use such data to explore compliance mechanisms, programmatic activities, decision rules, dispute settlement procedures, or organizational arrangements, to design effective international

institutions" (*Ibid*). Textual analysis of agreements documents and interviews are employed to collect data on regime architecture. It involves decomposition of conventions, treaties, protocols and international organizations to identify substantive and procedural characteristics and analyzing how these outputs are arranged to shape human behaviour (Vogler 2000). It is through regime architecture that transfer of authority from the international to the national takes place. Further analysis involves determining cause-and-effect mechanisms to understand how these successfully transferred the authority to solve the problem of environmental degradation in the basin.

Reports and publications (books and on-line documents) from the LVEMP secretariats, EAC secretariat, global water and environmental conventions, treaties and protocols relevant to this study, namely: The Agenda 21, The Convention on Biological Diversity, UN Water Convention, and other research publications on regime effectiveness analysis. These results are given in Chapter 5.

Question 3: What are the impacts of the regime?

This question investigates the regime consequences (impacts). It explores the "real world" effects of the regime in the basin. Its basic objective is to analyze effectiveness as problem solving. The evaluation of the impacts of substantive characteristics is attained through exploring cause-and-effect mechanisms of joint management. It is disaggregated and analyzed for its comprehensiveness, interconnectivity, strategy, and coordination, towards holistic or integrated environmental management in the basin (see Chapter 6). The contributions of generic elements or subobjectives of joint management are then synthesized and judged for its contribution towards holistic or integrated environmental management.

There are several methodological alternatives that are employed to determining impacts of interventions. Impacts of interventions can be discovered by comparing counterfactual situations (e.g. Borge 2007), or qualitatively by analyzing specific causal chain in detail, through dividing it into smaller steps (e.g. Van Evera 1997: 64-67; King, Keohane, and Verba 1994: 225-228). This study uses qualitative causal chain analysis approach to analyze regime impacts in the Lake Victoria Basin. It specifically employs the method of subobjectives: generic objectives for components (Mohr 1995) and the *modus operandi* method: establishment of most operative reason (Scriven 1974). Qualitative methods of impact analysis do not rely on counterfactuals but on establishing high probability of a physical cause (Mohr 1995: 261; Borge 2007). Mohr (1995) defines a qualitative approach to impact analysis as:

> "one that does not rely at all at evidence for counterfactual to make causal inference. It is qualitative in the sense that, no matter how many instances of the results may be observed and piled up, or instances of other pertinent results, the method of causal inference is not "comparative"; that is it does not rely on juxtaposing these observations on the resulting state of the world with others that support the counterfactual claim".

Evaluation of the impacts of procedural characteristics involves exploring the precautionary approach of the regime. It measures extent of biophysical changes caused by the implementation of programme components of the regime. In particular, the programme components implemented under phase 1 of LVEMP are measured and judged for their contribution to biophysical changes towards solving environmental degradation in the basin.

Box 3.3 Summary of subobjectives of substantive and procedural characteristics for impact analysis in the Lake Victoria Basin

Joint management (Substantive Characteristics)

1. Maximum sustainable benefits 2. Conservation of biodiversity and genetic resources

3. Harmonization of national programmes

Precautionary approach (Procedural Characteristics)

1. Fisheries management 2. Fisheries research 3. Water hyacinth control

4. Land – use management 5. Water Quality management 6. Catchment afforestation

Observations of programme components effects are made during a field visit to programme pilot sites (zones) in the Lake Victoria Basin. However, it was not possible to observe everything and therefore impacts observations were focused. What to observe depended on what was needed to adequately describe the impacts of program components on problem solving, its participants and addressed study component objectives. This involved "sensitizing concepts", i.e. those that provide a basic framework highlighting importance of certain events, activities, and changes on physical environment. Impacts analysis for procedural characteristics concentrated on the programme components, including fisheries research, fisheries management, and water hyacinth control among others.

However, weaknesses in observations prompt use of other methods to enhance reliability of data collected was sought. These were analyzed from documents, interviews, and observations, within the programme pilot zones in the basin (i.e. Winam Bay- Kisumu, Kenya, Napoleon Bay – Jinja, Uganda, and Mwanza Gulf- Mwanza, Tanzania). Also secondary data in the form of papers by other researchers, mid-term monitoring reports and project evaluation reports by funding organizations consultants offered key insights on

impacts. This study draws heavily from secondary data in the form of appraisal reports on the implementation of LVEMP1. These findings are summarized as the regime impacts. The results are given in Chapter 6.

Question 4: How effective is the regime and what policy recommendations can be drawn?

Inferential analysis was done to determine the regime partial effectiveness. Regime effectiveness ($\boldsymbol{\eta'}_{r)}$ is assessed from the summation of all levels effectiveness and how adequately the regime eliminates the problem it was intended to solve. This regime effectiveness analysis uses the AHP approach to determine the weights of generic elements of regime levels that are later used to calculate effectiveness. However, the rigorous AHP calculations using matrices are reduced by using computer based software, Expert Choice 11.5, which gives weights of the various components (see above). This software is employed to determine components weights for regime effectiveness analysis. These weighted and normalized values are combined using linear combination to construct regime effectiveness model. The formulae are shown here:

After determining the relative weights of the generic elements, the levels effectiveness score is derived using the formula

$$\mathbf{Ai} = \sum \mathbf{w}_{ij}\ \mathbf{x}\ \mathbf{z}_{ij} \qquad (1)$$

Where $\mathbf{A}_i$ is standardized value of weights of generic elements at the input level

$\mathbf{w}_{ij}$ is relative weights of generic elements at the input level

$\mathbf{z}_{ij}$ is the normalized weight of generic elements at input level

While the level effectiveness without interaction is computed using the formula:

$\boldsymbol{\eta} = \sum \mathbf{w}_{ij} \mathbf{x} \mathbf{A}_i$ (2)

Where $\boldsymbol{\eta}$ is

$\sum \mathbf{w}_i$ is summation of relative weights of generic elements at the input level

$\mathbf{A}_i$ is standardized value of weights of generic elements at the input level

The levels effectiveness with interaction is computed using the formula:

$\mathbf{w'}_j = \mathbf{w}_j \mathbf{x} (\mathbf{1.0} - \mathbf{DI}_{ij})$ (Level weight with interaction) (3)

Where $\mathbf{w'}_j$ is relative weight of e.g. input level with interaction

$\mathbf{DI}_{tj}$ is the degree of impact of e.g. input level at the time of analysis, determined by using the formula: $DI_{tj} = SI_{ij} - \mathbf{A}_{ij}$ and $SIij = \sum \mathbf{w}_{ij}$. This means $DItj = \sum \mathbf{w}_{ij} - A_i$

$\boldsymbol{\eta'}_j = \sum \mathbf{w'}_j \mathbf{x} \mathbf{A}_i$ (Level effectiveness with interaction) (4)

Where $\boldsymbol{\eta'}_j$ is

$\mathbf{w'}_j$, defined above

$\mathbf{A}_j$ is standardized weight of e.g. input level

Regime effectiveness ($\boldsymbol{\eta'}_r$) is summation of all levels effectiveness

$\boldsymbol{\eta'}_r = \sum \boldsymbol{\eta'}_j$ (5)

Determining consistency index

A consistency index is defined as an index which indicated how consistent the comparisons were made. The consistency index is defined as:

$\mathbf{CI} = (\boldsymbol{\lambda}\mathbf{max}-\mathbf{n})/(\mathbf{n}-\mathbf{1})$ (6)

After obtaining the consistency index it is used to determine the Consistency ratio (CR). The CR indicates how consistency our subjective evaluation is performed, relative to the average

of matrices generated. If the value of CR is less than 10%, it is considered as very consistent value. Values between 10% and 20% imply acceptable consistency. It is calculated as:

$$\mathbf{CR = CI/RCI} \quad (7)$$

Where: **CR-** Consistency ratio;

RCI- Random consistency ratio obtained from Tables of random consistency developed by Saaty (1990).

Regime effectiveness, as defined in Chapter 2, refers to how adequately the regime addresses the problem it was intended to solve. Adequacy is a measure that quantifies accomplishments by conceptualizing them as the proportion of the problem eliminated by the regime (see Lawrence Mohr 1995:8). Regime effectiveness analysis is therefore quantification of the adequacy of the regime in solving the problem it was intended to solve. Adequacy is defined as "a measure that quantifies accomplishments by conceptualizing them as the proportion of the problem eliminated by the regime" (*Ibid*). It quantifies accomplishment by conceptualizing the proportion of the problem eliminated by the regime. "Adequacy with desired outcomes is calculated as a function of the *shortfall"* of the regime (*Ibid*).

Adequacy = 1- R/C

Where R is the undesired shortfall of the regime created

C is the undesired shortfall of individual actors' effort without the regime.

The ratio R/C indicates the proportion of the problem remaining or the ineffectiveness of the regime.

Theoretical analysis

A regime effectiveness analysis as stated earlier without a reflection on the key themes in political science, international relations theory and international law theory is futile. Both

international relations and international law share common theoretical divisions (Armstrong et al. 2007: 69). Armstrong and others assert:

> "the dominant paradigms in both disciplines are similar in their core ontological assumptions about the world; the main challengers in each discipline also share remarkably similar world views".

The analysis of transboundary water regime effectiveness without such theoretical analysis is not complete. Regime effectiveness analysis as shown here is an inductive process. Induction, as Blaikie (1993:133) suggested that:

> "Corresponds to a popular conception of activities of scientists [as] persons who make careful observations, conduct experiments, rigorously analyse the data obtained, and hence produce discoveries or theories"

Hempel (1994) concluded that,

> "theory in such a strategy logically follows observations and generalizations and is little more that the statement of generalisable 'covering laws' consistent with an existing set of empirical observations" (Hay 2002:30).

This study therefore employed some international relations/international law theories as the statements governing laws. These theories, as explored in Chapters 1 and 2 include neo-liberal institutionalism, realism, constructivism and structuralism.

Verification

This section deals with verification issues such as triangulation, reliability, validity and generalizability and draws a general conclusion of this thesis method. As in all research, consideration must be given to construct validity, internal validity, external validity, and

reliability (Yin 1989). Case study approach is an already triangulated research strategy, Snow and Anderson (1991) asserted that triangulation can occur with data, investigations, theories and even methodologies. Stake (1995) stated that the protocols used to ensure accuracy and alternative explanations of findings are called triangulation. The need for triangulation arises from the need to confirm validity of the process.

Yin (1994) suggested that use of multiple sources of evidence ensure construct validity e.g. survey instruments, interviews, and documents. The specification of unit of analysis provides the internal validity as theories are developed, and data collection and analysis test these theories. External validity, though difficulty to attain, Yin (1994) asserts, that it could be achieved from theoretical relationships from which generalizations can be made. The development of a formal case study protocol provides the reliability required of all research.

Triangulation as a method has been used primarily to check and establish validity of a study with the premise that such an approach enhances the reliability, validity and generalizability of findings. Burgess (1982) identified three types of triangulations. Data triangulation is when different sources of data are cross-checked, investigator triangulation is when different evaluators are cross-checked for their results, theoretical triangulation, where theoretical perspectives of the data are cross-checked, (Burgess 1982: 163) and lastly methodological triangulation where different methods results are cross-checked, including qualitative and quantitative methods (Bryman, 2004: 454). This study uses the theoretical, data and methods triangulation approaches to validate its findings. Theoretical triangulation involved checking the theoretical propositions of the results of the study with what similar studies have theorized. Regime effectiveness analysis studies have focused on neoliberal institutionalism

theory or regime theory, however, light shed by alternative theories such as realism, constructivism and structuralism are used in this study to shed more light on environmental regime effectiveness analysis.

Data triangulation involves results of the interviews are related with that from other methods, like document analysis. Methodological triangulation involved how the different methods employed to measure same components gave results indicating the same direction. For example regime creation (inputs) was determined through interviews, documentary analysis and observations. If the results from these three methods points to the same direction, then the data is confirmed to be reliable.

Synchronic analysis involves a deep analysis of programmes research phenomena. This dictates evaluation of causal mechanism on top of other evaluation. Also to be reliable such analyses make use of multiple criteria and multiple methods. The criteria used here, first, focused analysis from the global/international water and environmental conventions, treaties, and protocols, referred here as vertical transfer of authority, then secondly, turned to regional programme and lastly pilot zones levels, referred here as horizontal transfer of authority. Various methods were employed to measure these criteria of regime effectiveness analysis, These include interview, documentary analysis, observations, and secondary data from research stations.

The generalizability and reliability of the results of this study was born from the multi-level analysis of various failures of cause-effect mechanism for regime effectiveness. The effectiveness in organization of collective action (regime inputs) was analyzed for its failures

to see if these influence effectiveness as transfer of authority (outputs) whose failures eventually influence effectiveness as problem solving. The failures in the three major categories of failure modes were in turn are analyzed for partial regime effectiveness through criticality analysis. How reliable this analysis is was determined by the process of triangulation which involves methods, data and theoretical triangulations.

Conclusion

This chapter has outlined the research method on how 'within-case' regime effectiveness analysis is done. The chapter framed regime effectiveness analysis in the context of systematic hierarchical analysis process. It explored the ontology and epistemolgy of regime effectiveness analysis. The epistemology described the methodology for this study and identified the methods toolbox for transboundary water regime effectiveness analysis in the Lake Victoria Basin. Section six introduces the case study of the Lake Victoria Basin, East Africa. It re-established the study aim and research questions, and how the later were going to be tackled. Finally it described ways of verifying results through triangulation, test for validity, reliability and generalizability of the study.

This chapter showed how critical realist was the paradigm of choice for this study of regime effectiveness analysis. Based on critical realism research paradigm the chapter showed how the critical realist regime effectiveness analysis cycle (Figure 3.1) was applied to the analysis of transboundary water regime effectiveness in the Lake Victoria Basin, East Africa. It identified the first element in the cycle i.e. *research questions* as follows: How was the regime created? What are the characteristics or the architecture of the regime? What are the

impacts of the regime? How effective is the regime in addressing the environmental degradation problem in the Lake Victoria basin?

These questions are approached through a research design guided by the Regime Analytic Level Process (RALP) model (outlined in Chapter 1). Through conceptualization of the model *observations* made to collect and data collected to answer the questions. A multi-method approach is used to collect data and answer the questions. *Regime effectiveness* is analyzed from the analysis of the effectiveness of the three levels, namely: inputs, outputs and impacts. *International relations/international law theoretical perspectives,* namely: neo-liberal institutionalism, realism, constructivism and structuralism are employed to validate this study approach. Lastly, the chapter concludes with aspects of verification of study findings. The following four chapters employ the methods identified here to answer the questions raised above and in Chapter 1. The next chapter, Chapter 4, answers the question: How was the regime created?

The chapter pointed to the need for multiple methods and theories to successfully analyze regime effectiveness. Whereas other researchers have pursued this line of methodology, their approach has been most comparative. The chapter has shown hybridity of theories and methods adds value to transboundary water regimes effectiveness analysis. The sufficiency of this methodology is further discussed in the conclusion.

Chapter Four

CHAPTER 4

INPUTS: The Creation of the Lake Victoria Basin Regime

Introduction

Chapters 2 and 3 have shown the usefulness and methods of regimes effectiveness analysis. This chapter marks out the creation of international environmental regime in the Lake Victoria Basin, East Africa. It initiates the RALP model approach to regime effectiveness analysis by exploring the creation of the Lake Victoria Basin regime (*inputs*). Transboundary water regime creation is the process of reaching agreements within an internationally shared water basin. It should be able to steer a hierarchy of interdependences between the various contexts, interests and levels of transboundary water governance – between governments, citizen preferences, political interests, the structure and management of organizations, and the core focus of public agencies. As such, it must link contexts, values and interests of governments, citizens, policymakers, organizations, and other stakeholders in a dynamic process. This means a common understanding of the nature of reality. This analysis explores the legal process with the aim of eliciting how fundamental values were considered to attain the desired social order (effectiveness as collective action).

The chapter unfolds as follows. Firstly, gives a general characterization of the basin in terms of its geographical, socio-economic and environmental characteristics of the Lake Victoria basin and second, develops the general process on the progression to international environmental regime creation in the basin through documents and fieldwork interviews analysis. It traces a chronology of politico-legal events at both global and basin levels on how cooperation for environmental management in the basin was created. The whole process is divided into early colonial, pre-independence, post independence and recent events relevant

towards basin-wide cooperation for the creation of international environmental regime. Third, it specifically focuses on regime creation by exploring how problem factors during the process of cooperation for international regime creation were considered i.e. whether assessments for problem identification, problem conceptualization, problem contextualization, the problem pressure and problem solving were done. Fourth, it then reveals the regime negotiation process by elaborating the negotiation process aspects of agenda setting, bargain mechanisms or negotiations, and signing of agreements in the basin. Fifth, a discussion of the process of international environmental regime creation in the basin is given by examination of the overall organization of collective action and lastly draws a conclusion of the regime creation process in the basin.

The Lake Victoria Basin

The Lake Victoria is formed by down-warping of the earth crust, came into existence during the last 400,00 years (Abila *et al.* 2006). It is Africa's largest and the Earth's second largest freshwater lake with a surface area of about 69,000 Km^2 (Balirwa *et al.* 2003). It geostrategically creates a wet point, shared by the three states of East (see Figure 4.1) and acts as the source of River Nile. The catchment extends to Rwanda and Burundi.

It is a relatively shallow lake with a maximum depth of about 79m and an average depth of about 40m. It lies at 1135 m above sea level and straddles the equator at its northern reaches (see Figure 4.1). Presently, precipitation is the main source of water into the lake accounting for 3613.8m^3/s (81.9%), with the rest, amounting to 796.6m^3/s (18.1%) comes in through rivers from the catchment (Abila *et al.* 2006). About 1500 years ago the lake completely dried up in a climatic phase of extreme dryness (Johnson *et al.* 2000).

The Lake Victoria Basin has a total area of 193,000km² and falls within three spatial contexts namely: the East Africa community (Kenya, Uganda and Tanzania), the Nile River Basin (The combined lake and river basins), and the global transboundary water context (Kiwango and Wolanski, 2008). It shared within the jurisdiction of three riparian states, namely: Kenya (6%), Uganda (45 %) and Tanzania (49%); and two catchment basin states namely: Rwanda (11%) and Burundi (7%) (Ntiba *et al.* 2001). It forms the lower end of the western arm of the Great Rift Valley. However, it faces far more complex social, economic, political and technical barriers than other transboundary lakes in the region (Duda 2002).

Figure 4.1 The Lake Victoria Basin.

Source: http://esdevelopment.iagt.org/neaf/image034.jpg

The Basin receives abundant precipitation, with an average annual rainfall of 1,424 mm which varies between 861 mm in parts of the Mara catchment to maximum of 2169 (Awange, *et al.* 2007). It has fertile soils and densely populated, it is a home to some 35 million people, roughly, a third of the overall population of the three riparian states (Abila *et al.* 2006). Population growth in the Basin is estimated at 6% per annum in the urban centres and over 3% in the rural areas. Kenya's part of the basin is very densely populated with the highest dependence on lake (*Ibid*).

Socio-economic characteristics

The lake and its catchment form a basin that is valued for its socio-economic potential and its immense ecological value. The basin with its resources serves as a source of water supply to households, industry and agriculture as well as fisheries, transportation, building materials, power generation and a depository for household, agricultural and industrial waste (Ntiba *et al.* 2001).

The lake forms an important common natural resource of East Africa community and features as the world's largest freshwater fishery with significant supplies to local consumptions and exports, particularly to the European Union and Asia. The lake is the source of the White Nile, an important asset for the Nile basin members. Riparian communities are basically dependent on fishery with some 3 million people earning their livelihood from fishing and fish processing. The annual fish landing ranges between 400-500, 000 tons, with Tanzania landing about 40%, Kenya 35% and Uganda 25%; worthy $600 million annually (*Ibid*).

The lake is also important for hydropower generation at Owen Falls Dam Uganda. The current power output is estimated at 380MW, with some exported to Kenya. Nalubale Dam has 10 generating units each producing 10MW (total of 180MW). Chira Dam has 5 generating units each producing 40 MW (total of 200 MW). However poor hydrology and water hyacinth infestation affects hydropower generation. The average power production is 340 MW. There is construction work for another hydropower plant at Bujagali, further downstream of the Owen Falls Dam, Uganda. It is estimated to produce 250 MW of hydropower (Kaheru, Deputy Construction Site Manager, 2008).

The rapid rise in human population in the Lake Victoria watersheds has put significant pressure on the environment (Ntiba et al. 2001). It is heavily used in the production of coffee, tea, cotton, sugarcane, wheat and maize, as well as dairy farming in its catchment area (*Ibid*). Over 70 per cent of the population in the Lake Victoria catchment is engaged in small scale agricultural production (*Ibid*).

Generally, poverty levels are high with about 70 per cent of the population living below the poverty index of one dollar per day (*Ibid*). The HIV/AIDS infection rates are also high believed to range from 10-40 per cent in the basin compared to 6-7 per cent in the rest of the population in the three countries (LVFO 2009). The unemployment rate is also alarming in the basin, pushing more man-hours to the lake, a free control and easily accessible way of making a living (Abila *et al.* 2006).

Environmental challenges

Until the 1960s the Lake Victoria could boast a rich, well balanced plant and animal species complex (Greenwood 1956). However, for about two decades now, overfishing, pollution

from industrial and agricultural sources, noxious water weeds and predatory introduced fish species have continued to threaten the sustainability of Lake Victoria resources and, consequently, the economies and well-being of the surrounding human populations (Ntiba *et al.* 2001, FAO 1990; FAO 1998; LVFO 1996). Forests in the watersheds are being rapidly developed into agricultural fields, firewood, charcoal, and human settlements. Deforestation coupled with bad agricultural practices has exacerbated the problem of siltation in the rivers and lake, resulting in a degraded fish habitat.

Recent history shows changes in physical, biological, social and limnological parameters (Ntiba *et al.* 2001, Abila *et al.* 2006). These changes are caused by catchment destruction, overfishing, exotic species introductions, pollution from development trajectories all contributing to oxygen depletion of the lake and mass extinction of indigenous fishes (Rabi 1996). The current export boom from the lake's shallow waters is at enormous ecological and social cost. The current price is massive loss of native species, particularly due to the introduction of Nile perch and increased conversion of the fishery to export commodity rather than local protein supplies, with minimum returns to local populations (Abila *et al.* 2006).

It is observed that increased agricultural and urban runoff in the lake watershed, and discharge of domestic and industrial waste into the lake and their effects on the ecology of the lake has had profound impacts. The conversion of wetland areas around the Lake Victoria for agricultural and/ other uses have had detrimental effect on the lake ecosystem. This is observed vividly as the water quality of the lake deteriorated due to widespread agricultural, industrial and urbanisation activity in the catchment areas. The lake fauna and flora has changed drastically, followed by changes in species composition, loss of biodiversity and significant changes in the fishery (Kayombo and Jorgensen 2006).

There is also a significant increase in industrial development in the major urban centres of Kampala and Entebbe in Uganda, Mwanza and Bukoba in Tanzania, and Kisumu, Homa Bay and Kendu Bay in Kenya. Fish processing industries have been established which target the international markets for Europe and Asia, with the number of fish processors increasing due to increasing fish demand (Ntiba *et al.* 2001; Yohannes 2008). Rapid industrial development has greatly contributed to the polluting of the lake. Pollution from point and non-point sources has contributed to the degradation of lake water for habitat and drinking use. Most industries do not treat their wastes and rapidly expand areas are not served by public sewage system. Unfortunately, there is a general low awareness of environmental conservation among industrialists, poor sewer systems, inadequate sewer treatment plants and too few technical personnel. The leading suspected polluters include breweries, sugar refineries and beverage processing factories, dairies, oil and soap mills, undertreated municipal sewage and leather tanning factories (Ntiba *et al.* 2001). Most of these factories discharge their effluents either directly or indirectly into the lake.

It has also been observed more than a half of the lake flow experience prolonged low oxygen levels and decreased transparency (Abila *et al.* 2006: Hecky, *et al.* 1994).This means the Lake Victoria is in danger of becoming the largest pool of dead water. All these are sources of the observed evolving changes in the lake that seriously threatens its ecosystem function and overall diversity (Hecky and Bugenyi 1992, Verschuren et al. 2002;).

It can obviously be stated that, the Lake Victoria and its basin is under environmental siege (Rabi 1996), and therefore needs management intervention for the benefit of today's and future generations. The lake is facing vast array of problems ranging from overfishing, siltation from the erosion of deforested watersheds, endemic species extinction, industrial

pollution, eutrophication and climate change (Odada *et al.* 2004, Ntiba *et al.* 2001). It is also a global center for tropical aquatic biodiversity (Ogutu-Ohwayo 2008).

The Lake Victoria basin is a significant economic hub to the rural communities of Kenya, Uganda, Tanzania, Rwanda and Burundi. However, the above evidence shows how the economic development of the basin is against its sustainability. There is no doubt that the basins' economic growth is most likely to suffer if it continues at the current trends. Past and present management efforts have to be analyzed to identify failures and prescriptive action put in place to correct these failures.

The Creation of a transboundary water regime

This section explains the creation of the transboundary water regime in the Lake Victoria Basin. Transboundary water regimes ought to fashion a world public order that advances human dignity (to meet their worthnessand wellbeing, and that of future generations). According to McDougal and Lasswell (1943), this is prescriptive to international law, quite unlike the descriptive approach of legal positivism or international relations theory of realism. From their perspective transboundary water regime effectiveness analysis is not to ascertain the content of rules, but to advocate rules that promote core community values. According to Armstrong and associates (2007:88) the traditional notion that international law comprises only those rules to which states have consented to, 'cloaks the tough moral choices that need to be faced in developing a functional world order' (*Ibid*). They assert:

> "The values that serve the interests of most community members- in particular, human dignity must make the priority so as to develop a standard and sustainable world public order".

In this study, the legal theory process, as stated above, contributes two core ideas to transboundary water regimes effectiveness analysis, namely: transboundary water regimes should express fundamental values of human dignity, and transboundary water regimes as processes. twenty-three interview transcripts and documents/reports analyzed for regime creation in Lake Victoria basin. The following section stipulates the problem factors and process factors in regime creation in the Lake Victoria basin.

The problem factors

General problem identification

The root causes of a problem must be addressed for any technological and politico-legal intervention (ILEC. 2005: xiii). Problem identification is the recognition and confronting of the field of uncertainty by putting pieces of information together (Golightly 1987: 57). Problem identification is considered here by exploring the history of the development process in the basin in relation to the global/international level.

Analyzing problem identification in the Lake Victoria basin for regime creation is based on the gross impacts of development on the environment with its resultant effect of loss of biodiversity, and how these were realised as a problem for regime creation. It also considers the significance of water as an essential resource to support life and the fact that freshwater resources are under threat of environmental degradation. This led to the creation of the basin environmental regimes to address these problems.

Evaluation of problem identification in the basin reveals a complex of historical impacts of the wider basin development efforts for economic growth and food insecurity[6]. The goal of development in the basin is to improve the economic and food self-sufficiency status of the basin communities and states. This process is examined here in the following chronological order.

1800s - 1940s: Colonization by German and Britain

During this period the basin was under one colonial power. The British had first hand contact with the Lake Victoria basin in 1858, when John Speke arrived at the southern shores and proclaimed to have discovered the source of River Nile (Rabi, 1996). Henry Stanley in 1875 confirmed Speke's discovery to England with a call for missionaries (*Ibid*). England sent into the region soldiers and traders. For twenty years Kenya and Uganda became territories of England while German took charge of Tanzania (*Ibid*). The basin was therefore unconsciously shared by England and Germany, the Kenyans, Ugandans and Tanzanians. The colonial powers deforested vast tracts of land in the Lake Victoria watershed to plant tea, coffee, sugar, tobacco and cotton.

The human population in the basin increased and interest in the use of the lake by the local communities shifted from subsistence to commercial fishing to satisfy growing urban centres (Rabi, 1996). In 1905, the fishing pressure in the lake began to intensity with the introduction of gill nets that replaced indigenous papyrus nets and fish trap. The aim was to foster food-self sufficiency and economic development through intensified resource exploitation (*Ibid*).

[6] Economic development and food insecurity continue to affects relations among the riparian states. The current war over Migingo Island between Kenya and Uganda indicated the depth of the matter.

The 1950s: Stocking of Lake Victoria.

By early 1950s tilapia (Cichlidae) and labeo species, the commercial species, were extinct (Riba 1996). The lake was stocked with exotic species of tilapia, the Nile Tilapia, *Oreochromis niloticus*, which predated on minute forms of plant and animal life (zooplanktons) (*Ibid*). In 1955, the Nile Perch *Lates niloticus* (centropomidae) was introduced into adjoining Lake Kyoga which found its way into the Lake Victoria (*Ibid*). The norm was to manage the lake for maximum economic returns.

1960s-1970s

Activities at the basin level were dominated by colonial administrators who favoured Nile perch over other species in the lake because of its size, fillet production and game fishing interests. In early 1960s the lake was actively stocked with Nile perch, a predatory fish species that fed on indigenous species. However at this time, some indigenous species also recovered their populations and made 80 per cent of the lake biomass (Riba 1996). In 1967, through the support of UNDP, the three partner states formed the East Africa Community which boosted the EAFFRO formed in 1947.

Problem identification for regime creation in the Lake Victoria Basin was not a conscious process. It basically started as scientific study interests, initiated by one such expert, Robert 'Bob' Hecky (Currently Commissioner, Great Lakes Commission, USA) (Kitamirike 2008, Asst. Commissioner Transboundary water, Entebbe, Uganda). Through a series of biophysical and chemical studies of the lake, Hecky discovered significant changes to the

environmental health of the lake[i]. It is through his initiative that regional scientists embarked on serious evaluation of the lake and how it is influenced by its basin. However, these studies just like prior studies on introduction of exotic fish species did not raise regional concern for international environmental regime creation.

Secondly, it was through interests in regional fisheries conflicts resolution (Kasovo 2008; and Maro 2008). According to Mr. Kasovo and Mr. Maro, regional fisheries conflicts between Kenya and Uganda became intense that the heads of States had to come together to address the situation. According to Afrika News (2009), this has taken a new turn as indicated by the Kenya-Uganda conflicts over Migingo Island. It observed that the Lake Victoria fish could be a 'model' conflict for the continent. It asserted that:

> "If sanity doesn't prevail, Kenya and Uganda could clash over the small Lake Victoria island of Migingo, setting the stage for more resource-related conflicts in Africa"[7]

Ogutu-Ohwayo (2008) observed that, the handling of development activities in the basin and East Africa has to be on basin-wide or regional approach respectively. Whereas the colonial government recognized this, we were divided during independence (*Ibid*).The basin as observed earlier is shared by three riparian states Kenya, Uganda and Tanzania and two non-riparian members Rwanda and Burundi. Naturally, the people of the region and the land are the same. The basin communities historically share a common ancestry, either north eastern Africa or central Africa, as such share cultural norms. Also the physiognomic condition of the basin is the same in almost all states, sharing arid and semi arid conditions and high potential arable land conditions (Ogutu-Ohwayo 2008). The people are therefore one, the land is one, and so is the lake, only separated by states boundaries created during colonial period (*Ibid*).

[7] The Administrator, AfrikaNews.org, Saturday, 21 March 2009: A Kenya-Uganda clash over L. Victoria fish could be a 'model' conflict for the Africa continent.

According to Ohwayo (2008) and Balirwa (2008) the initial cooperation of the East African countries dates back into the colonial era. Kenya, Uganda and Tanzania were under the same colonial administration. As such, the colonial government found it easier to implement regional development for economic development. The railway, airway and East Africa Fisheries Research Institute were under the East African Common Service Organization in 1940s-50s (*Ibid*). When Kenya, Uganda and Tanzania became independent they had to find a way of maintaining these regional relations. It is in 1966 that they formed the first East Africa Community, formed to take care of the colonial issues handled at regional level (*Ibid*).

Both colonial and post-independent states identified the problem in the basin as poverty or poor economic growth and food self-sufficiency. However, they realized the basin was endowed with natural resources which could be exploited for economic development and improve on food insecurity. The resource exploitation interventions were not sustainable and had environmental degradations consequences that had to be addressed for sustainable development in the basin.

Pioneer work for basin-wide scientific cooperation was initiated by Ugandan experts through a country proposal to holistically manage the Lake Victoria using systematic approach to environmental management (Orach-Meza 2008). This proposal was supported by The GEF. However, the creation of basin-wide regime in the Lake Victoria basin to manage the environment took a process across changing period of regional and international political interventions. Lastly, a global concern on environmental degradation was identified during the Ramsar Convention 1971 and 1992 Rio Conference (Bwathondi 2008; Nyaora 2008). The international community recognized the environmental degradation on wetlands and

water resources in general and called for concerted effort to sustainably utilize these resources.

Problem conceptualization

Problem conceptualization is an integrative strategy to take expertise thinking beyond the facts and singular theories to the level of underlying concepts (Nakitina 2002). In the integrative strategy for regime creation in the basin, basic problem conceptualization was clearly missing as identified by the interviewed experts (Balirwa 2008; Bwathondi 2008; and Ohwayo 2008).

A conceptualization of the basin problem for regime creation in the basin missed key fundamental activities which, perhaps, the initial phase of the regime could have successful addressed (see Ch.6 on impacts). Important issues such as experts' facts of the basin problem made the findings of the initial phase of the regime. Identification of key concepts and singular theories of the nature of the basin problem did not form part of the regime creation process but an outcome of the regime. While a lot of studies were done in the basin, they were so much fragmented without unifying conceptualization. As a result, a problem conceptual map is missing to offer a true picture of the nature of the problem in the basin. It is the conceptual map which gives valuable thoughts about the problem to be solved. It also helps in identification of stakeholders and end-users of problem solving.

Problem conceptualization effort in the basin can be categorized into three phases. Phase I is identified as low socio-economic development, poverty, food self-insufficiency, population increase and subsistence fisheries economy. The problem was the slow rate of resource

exploitation to spur required economic growth for poverty alleviation and food self-sufficiency. Phase II is identified as characterized by high population growth, subsistence fishing and farming, introduction of exotic commercial fish species, expansion of agricultural and fishing activities through new technology such as use of gillnets, beach seines, trawlers, and agrochemicals to spur economic activities to improve living status. The norm during this phase was maximum yields through use of modern technology for economic growth. Basically, Phase II is not conceptualized as a problem as it increased the socio-economic welfare of the people in the basin.

Phase III is characterized by population increase, deforestation for timber harvesting and agricultural expansion, soil erosion and siltation of the lake, overuse of agrochemicals, overfishing of commercial fish species, industrialization and urbanization around the lake, municipal and industrial waste disposal into the lake, eutrophication, invasive weed infestation, low fish landings, reduction in lake water level and general reduction in economic value of the lake. This was generally conceptualized as environmental degradation problem which adversely affected the economic returns from the lake.

The problem in the lake was perceived as the invasive Water hyacinth weed (*Eichhornia crassipes*). Whereas there were other invasive species in the lake, the Nile perch and Striga weed, it was the water hyacinth infestation that called for attention to jointly manage the lake and its basin. Water hyacinth is a free floating and migratory flowering plant introduced into Lake Victoria through River Kagera (Wilson et al). The weed doubles in mass in 11-18 days (*Ibid*). It is sustained by the high nutrient input from the rapid expanding riparian urban centres and the catchment.

The weed spread very fast after first being identified in the lake in 1982 (Bwathondi 2008). In the actual sense, problem conceptualization was not envisaged as key component during cooperation for the basin environmental management. The World Bank and member states scientists worked together to conceptualization the problem of water hyacinth However, it lacked a transboundary diagnostic approach to problem identification.

Problem contextualization

Problem contextualization as understood here is the process of embedding knowledge about the problem into socio-economic welfare (Nikitina 2002). In early 1980s, few government officials in Africa viewed the shift in the Lake Victoria's fish fauna as a disaster (Riba 1996). Already there existed a regional desire to collectively manage and share the benefits of Lake Victoria (Bwathondi 2008; FAO 1985). There was also the concern on the state of global environment.

The period 1980s-1990s saw significant efforts in shaping basin-wide environmental regime creation. First, the FAO Committee on Inland Fisheries of Africa (FAO CIFA) in 1980 set up a regional sub-committee for the development and management of the fisheries of Lake Victoria. The Sub-committee came up with recommendations fostered regional cooperation in the Lake Victoria. FAO and UNDP also stressed the importance of cooperative approach in planning for exploitation and management of the resources of Lake Victoria.

Furthermore the basin member states adopted the Monrovia Strategy whose aim was to foster food self-sufficiency and increasing fish production (FAO 1985) in the basin. The donor

community eventually posed a demand on the three member states to create joint norms, principles, rules and develop decision-making procedures for sustainable development of the Basin (*Ibid*). However, a serious environmental degradation contextualization for regime creation in the Lake Victoria basin was lacking. The production of consensual knowledge is very important for regime creation. However, data has not been contextualized for problem solving in the basin. There are gaps on how the problem of environmental degradation is perceived, the knowledge derived from research, and how these relate to the socio-economic welfare (Bwathondi 2008).

Earlier hydrological assessments indicated that the lake's nutrient loading and dissolved oxygen demand are increasing at alarming rates. Domestic water supplies are affected, with increasing costs in water treatment over changing lake water quality, while fishing efforts increased with decreasing fisheries. It is until when the lake was covered by weed, the water hyacinth, that the three Head of States had to come together to address the problem. In Uganda water hyacinth was clogging the Owen Falls Dam at Jinja and had to source for funds to clear water hyacinth. There were remarkable efforts at the international level during this period towards creation of regimes for solving the problem of environmental degradation resulting from natural resources exploitation.

Problem pressure

Problem pressure here refers to the perceived visibility of a given problem (Jänicke 1999; Lindemann 2005). It is how resultant environmental changes affect the socio-economic and social wellbeing of the people. The demand to protect global environment from human induced degradation from development activities was recognized as significant to the creation

of the basin regime (Nyaora, Bathwondi and Ohwayo 2008).

At the international level UNEP was created to address environmental problem and was situated within the basin member states: Kenya. This had significant contribution on the transfer of the norm of environmental conservation. Early efforts in the basin were initiated by UNEP (M'mayi 2008 Programme Officer UNEP DEWA). It started in the 1970s-1980s and grew into agreements like Agenda 21, the Biodiversity convention in the 1990s (*Ibid*). By this time there were significant changes in the nature and species composition in both terrestrial and aquatic environment. It is during this period that the concern for environment came upfront when all major conventions came into play. All the countries of the world agreed to address environmental problem and conserve biodiversity as it was seen as the natural bank account of the world.

The water hyacinth was a problem or a menace affecting the life of fish, mainly the Nile perch. It affected fisheries in the lake which served as a European Union fish pond. Fresh fish exports from the basin states to European Union and other part of the world diminished. This made scientists from all over the world to join the East Africa counterparts to evaluate and monitor the lake. It was through these studies that the problem was basin-wide and called for cooperation.

Significant effects by non-state actors were realized in the loss of fish exports with the European Union imposing bans on fish exports from the Lake Victoria basin. The lake water levels had started to decrease, a fact which alarmed members of the River Nile Basin. It is at this time that Egypt started funding development projects in Uganda geared towards managing the lake and its catchment.

Basin-wide, many people did not know where the algal bloom was coming from (Bwathondi 2008). People complained of itching skin with persistent scratching after getting into contact with the lake water. They also experienced malaria-like symptoms due to the presence of blue/green algae in the water they used, which are toxic. The local populations looked upon their governments for solutions to the lake problem, hence set an agreement to come together to face the problem (*Ibid*).

An urgent need was realized when the spread of water hyacinth in the lake was increasing at alarming levels. It was at this point that regional scientists were joined by international scientists from all over the world, including UK, Canada, America, Netherlands and the World Bank to the study of the lake. On the political front, the spreading weed made the three riparian states to come together to address the problem. Major effects to development were seen in the form of reduced efficiency of operation of the Owen Falls hydroelectric plant and blocked access to the ports, fish landings and watering points. It interfered with fishing operations, fishing boats and gears, recreational activities and commercial transportation for people and goods (KEMFRI, 2007). Through its excessive evapotranspiration, it led to increased water loss, destroyed fishing ground through obstructing light penetration into the lake, lack of nutrients and competition for oxygen and provided ideal habitat for disease vectors (Othina et al 2003; Njiru et al 2003). It is these factors that indicated something was wrong with the lake and made the heads of governments address the problem.

Problem solving

Problem solving is not by technical expertise alone, but by wisdom (Nikitina 2006). The Lake Victoria basin is a shared resource and therefore efforts by individual states were not

adequate to address the basin environmental problem. It was through this realization that cooperation was a must. Although this was earlier realised by scientists engaged in the fisheries management in the basin, basin-wide environmental management efforts were still to be realised. The transnational nature of the Lake Victoria and its basin can be envisaged under the common pool resource scenario. The use of the lake and its resources is open to all. Earlier global efforts to solve environmental degradation in international watercourses were pioneered by creation of conventions that governed actors' behaviour in these resources. Typical among these were, the Rio Declaration Chapter 18, the Convention on Non-navigational use of International Watercourses, the Convention on Biological Diversity, and the Ramsar Convention. A central norm to all these regimes is the norm of joint management through cooperation for the management of transboundary resources. This norm was transferred to member states sharing resources demanding joint management for their sustainable use.

The international community actively created agreements and conventions on water and environmental management to govern shared resources. Important among such agreements and conventions for transboundary water resources were the International Law Association's 1966 Helsinki rules, 1969 Africa Convention on Nature and Natural Resources, 1971 Ramsar Convention, 1972 Stockholm Declarations, the Mar del Plata conference. Although the three partner states are not party to all these global regimes, the norms of these regimes indirectly influenced their joint management of the Lake Victoria basin. This was basically through the operational orders and directives of donors, especially the United Nations, World Bank, European Union, FAO, and other development partners from Europe made the norms and principles of these conventions and agreements diffuse into the region. This norm diffusion is explained here.

Attempts at fisheries collaboration among Kenya, Uganda and Tanzania are among the oldest on the continent. As early as 1928, it was recommended that a unified lake-wide authority for regulation and for collection of fisheries statistics be set up. There was reduction of fish catch with overfishing in the lake. The fishermen turned to nets with smaller mesh sizes to meet their demand. The conservation efforts in the Lake Victoria basin have been very active since colonial to post-colonial times mainly initiated and dominated by external drivers and statists approaches (Balirwa, personal interview).

The three East African countries share Lake Victoria and its resources. Protection and restoration efforts in one country would not have been adequate. A holistic approach to the management of Lake Victoria was identified vital for the sustainable development of the basin (Orach-Meza, personal interview). Fisheries collaboration attempts among Kenya, Uganda and Tanzania are among the oldest on the continent (Balirwa, Orach-Meza and Ohwayo, personal interviews). As early as 1928, it was recommended that a unified lake-wide authority for regulation and for collection of fisheries statistics be set up (Orach-Meza). Establishment of the East Africa Freshwater Fisheries Research Organization (EAFFRO) in 1947 solidified collaboration, and it was boosted further with formation of the East African Community in 1967.

After the Stockholm conference, FAO fostered moves and created a Committee for Inland Fisheries in Africa in 29th December, 1972. This was after recognizing more and more fish stocks were depleted, the global average annual growth in fish catches fell to about 1 per cent in 1970 from 6-7per cent in between 1950 and 1969 (Riba 1996). The FAO efforts were focused on improving future food security, “especially in low-income countries where fish

are a principal source of animal protein and where millions secure their livelihoods from fisheries activities" (Brundtland Report Ch.10 para 24). The three partner states are known to have ratified to the 1971 Ramsar Convention, Uganda was the first to ratify to the convention on the 4th July 1988, then Kenya, 5th October, 1990, lastly Tanzania, 13th August 2000.

It is during the FAO (1972) CIFA symposium that fisheries scientists from all the three Lake Victoria riparian countries joined the FAO committee for Inland Fisheries of Africa (CIFA) at a kind invitation of the Government of the Republic of Chad (source?). Among the priorities identified by this committee was cooperation for joint management with respect to international water by member countries (1972 FAO CIFA para. 21). It is in fact during this first session that the symposium recommended the establishment of subsidiary bodies on individual international waters including the Lake Victoria Basin. The three riparian countries of Lake Victoria, Kenya, Uganda and Tanzania, expressed the desire to have FAO's assistance in establishing a sub-committee on Lake Victoria fisheries to coordinate their management activities on the fisheries of the lake (1972 FAO CIFA para 26). It was therefore recommended under Recommendation CIFA/72/2 that the Director General FAO, provide assistance in the formulation of agreements between countries expressing formal interest in establishing bodies for the joint management of individual international waters. An earlier coordination mechanism was created under the defunct 1967 East Africa Community. After the disappearance of coordinating mechanism in the basin with the ending of the East Africa Community in 1977, the need for collaboration was felt so strongly that a special CIFA sub-committee for Lake Victoria was set up in 1980.

At the international level also non-state actors, the World Bank (WB) came in after the Rio meeting to assist developing countries to clear their environmental problem. The Global Environment Facility (GEF) was set aside to offer developing countries with grants to manage the environment. There were other several funding agencies that helped to tackle the environmental problem in the lake. Other funding agencies such as IUCN funded fish trade in the lake.

At the regional/basin-wide level, there was difficulty in the implementation of lake wide management measures due to lack of a stronger inter-governmental mechanism (Bwathondi 2008; Ohwayo 2008; and Orach-meza 2008) . This led to the design of proposals for the Lake Victoria Fisheries Organization (LVFO) whose establishment later supported the Lake Victoria Environmental Management Programme (Orach-meza, personal interview). The programme was to ensure that regional fisheries management would operate within a regional framework for environmental action, rather than having only commercial orientation (Orach-Meza 2008).

The process factors

The process for regime creation in the basin involved the interplay of international and regional/basin-wide efforts. These are considered here in three distinct but overlapping phases: agenda-setting, negotiations and regime formulation. The agenda-setting phase explores how both international and regional/basin-wide activities catalysed problem solving actions, particularly by identifying the problem and calling upon states to do something. At the international level agenda setting started with addressing impacts of development on the environment by setting up United Nations Environment Management Programme in 1972

through a resolution adopted in 1970 by the UN General Assembly. It is this programme that came up with sectoral environmental agenda which led to the creation of conventions and protocols on various environmental aspects including water. At the Rio conference of 1992 parties identifies the impacts development on freshwater resources. Chapter 18 of the Rio Declaration set the agenda for managing transboundary freshwater resources. It is during the Rio +5 that the United Nations Convention on Non-Navigational use of International Watercourses of 1997 was adopted after some twenty years of work by the "Working Group of the Whole" of the sixth legal Committee of the General Assembly, on the basis of draft articles adopted by the United Nations International Law Commission (ILC)[8].

On the other hand, non-state actors, in particular the activities of the FAO Committee for Inland Fisheries in Africa (FOA CIFA) as indicated earlier dominated the agenda setting activities especially by addressing changes in the fisheries sector. Almost all sessions of the FAO CIFA meeting indicated here addressed the agenda of Lake Victoria which led to the creation of the FAO CIFA Sub-committee for the Lake Victoria. Other transnational agenda setting efforts were taken by the Governments of Netherlands, Sweden, Norway and France.

At the regional/basin-wide level, agenda-setting was started when the Tanzania Minister of finance, Hon. Kigoma Malima, attended the 1992 Rio meeting and came with the idea of starting environmental management in Lake Victoria (Bwathondi, personal interview). By this time, water hyacinth had already been identified as an environmental constraint in the lake. He contacted his counterparts in Kenya and Uganda who focused on tackling the water hyacinth problem affecting joint economic zone. It started with studies to sensitize other

[8] The Report of the International Law Commission The work of ITS Forty-Sixth Session , UN GAOR, 49th Sess., Supp. No. 10.

members on the environmental problems of the lake. Regional scientists were joined by other scientists from all over the world, including Britain, Canada, and America. It is through these initiatives that the three head of states had to come together to start negotiations to address the problem facing the lake. Currently, agenda-setting is the role of the Lake Victoria Basin Commission, under the current East Africa Community.

At the negotiation phase explores how the actors at regional/basin-wide level convinced one another to come up with strategies to address the problem. It also explores the influence of international actors on how they shaped debates about proposals, how they shaped the positions basin states took in the negotiations, and/or, how they affected the final outcome of negotiations. At the international level, the international community under the United Nations was organizing conferences of parties (COPs) to raise concern on the state of our changing environment global by addressing hot issues such as water and air pollution. As members of the global environment, basin states participated in these key global events became members to relevant conventions and treaties. Typical among them include the 1971 Ramsar Convention, the 1987 World Commission on Environment and Development, the 1992 Rio Conference and the 1992 Convention on Biological Diversity.

Negotiations at the international level were also dominated by basin states, the Nile basin states and European counterparts. Typical was the framework of the 1993 driven more by external drivers and one internal, the Technical Committee for the Promotion of the Development and Environmental Protection of the Nile (TECCONILE) played a significant role in setting the pace for more concern in regional environmental cooperation. Driven more by external drivers and one internal, it contributed to the creation of international

environmental governance in the Lake Victoria basin, through the Lake Victoria Environmental Management Programme in 1994. The basin states entered into partnerships with World Bank, Swedish Government (through SIDA), the Norwegian Government (through NORAD), The France Government, The Netherlands, and European Union.

At the regional/basin-wide level, the nature of negotiations here were quite different from normal regime creation process. This is a basin which has had a long history of cooperation as already stated. However, discussions to broaden regional environmental cooperation covering the Lake Victoria Basin started in the late 1992. Vision sharing for combined bargain started with Tanzanian Minister of Finance, on his return from 1992 Rio contacted his counterparts in Kenya and Uganda and initiated negotiations to address the environmental problem in the basin.

There was difficulty in the implementation of lake wide management measures due to lack of a stronger inter-governmental mechanism. This led to the design of proposals for the Lake Victoria Fisheries Organization (LVFO) whose establishment was supported by the Lake Victoria Environmental Management Programme. The programme was to ensure that regional fisheries management would operate within a regional framework for environmental action, rather than having only commercial orientation (WB 1994).

However, Uganda had already started addressing the problem but not at a basin-wide level). To address the problem at a basin-wide level required finances. The FAO CIFA subcommittee had started addressing aspects of sustainable fisheries management in the lake

by involving the three riparian member governments, through their ministries of fisheries as early as 1982-3. Holistic mechanisms to balance incentive structure started when each of the three riparian countries wrote their National Environmental Action Plans (NEAPs) that acknowledged that Lake Victoria demanded urgent attention through regional cooperation.

The NEAPs focussed on problems of water pollution, biodiversity loss, land degradation, deforestation, and damage of wetlands, all central concerns for the lake and its catchments. Scientists and resource managers increasingly warned that absence of a regional management framework may threaten the future viability of the lake basin. Instruments to reduce transaction costs were put in place in May 1994 when the three riparian governments decided to enter into an agreement jointly to prepare and implement a Lake Victoria Environmental Management Programme through an Agreement to Prepare a Tripartite Environmental Management Programme (APTEMAP) for Lake Victoria on the 5th August, 1994.

This agreement constituted a framework for action fully responsible to the requirement for a Strategic Action Plan (SAP). The SAP preparation included extensive stakeholder consultation. It identifies, acknowledges and analyses the transboundary water related environmental concerns which the three governments share in common. It also expresses a joint determination to build capacity of existing institutions, establish new ones, in order to adopt a comprehensive approach to addressing the shared transboundary concerns, and implement measures to deal with the priority concerns of community stakeholder involvement and measures to raise public awareness. It is in 1997 that the three riparian member states Kenya, Uganda and Tanzania initiated phase 1 of the Lake Victoria Environmental Programme was initiated with funding from World Bank and Global Environmental Facility (GEF).

The Lake Victoria regime creation: a discussion

This analysis has shown how the creation of the Lake Victoria basin regime had a global foundation to dealing with a local problem i.e. "acting locally but thinking globally". However, the findings suggest that the progression to creation of the basin regime reveal the otherwise: an "act globally and think locally" approach. In this approach, the creation of the regimes involved "mobilization of authority from the top". The general authority for local environmental management originated from the international/global level (i.e. Rio Conference), probably packaged for local use through GEF and World Bank operational directives[9]. This chapter explored this by tracing earlier consequential interventions leading to the global 1992 Rio Conference on Environment and Development, and then explore how these efforts were packaged to solve local environmental problems in the Lake Victoria basin. It is from this background that the general framework for regime creation in the Lake Victoria basin is drawn.

The chapter explored the evolution in systems of resource exploitation in the Lake Victoria and its basin. The transition periods linking early colonial, through pre-independence, to post independence, showed increasing pressure on basin resources to meet development needs and food self-sufficiency. However, the findings suggest these changes were also taking place at the global level. Similar signs of stress on the environment were being realized as a result of resource exploitation for development at the global scale as confirmed by the Rio 1992 conference. As such, the analysis for regime creation shows there was 'interplay' between the basin events to address joint environmental management and creation of global regimes

[9] The 1994 World Bank Operational Manual on Projects on International Waterways: Operational Poicies (OP 7.50); Bank Procedures (BP 7.50), and Good Practices (GP 7.50).

addressing environmental stress. These results suggest global efforts, through donor agencies, shaped basin efforts in the creation of basin regime, through 'norm diffusion'.

However, the focus of international agencies was to exploit natural resources for food self-sufficiency both locally and abroad. The 1970 FAO Committee for Inland Fisheries in Africa (CIFA) set the pace for exploitation of fisheries resources in water basins to support efforts for food self-sufficiency and poverty alleviation. It is the United Nations General Assembly that started getting concerned with changes in water basins. This concern led to the 1971 Ramsar Convention on the conservation of wetlands, which set the stage for the conservation of freshwater resources, then the 1972 Stockholm Declaration on human environment and later the 1977 Mar del Plata Conference on management of freshwater resources whose outcome were the 1992 UNECE Water Convention and 1997 UN Water convention.

There were also individual state and non-state actors that got involved in the management affairs of transboundary water resources in Africa. The findings suggest the European Union and international donor agencies had significant influence on the creation of the basin regime. These actors interacted with governments and intergovernmental organizations in both national and basin-wide policy processes. These players were significant in the setting-up of meetings and the politico-legal arrangement for the creation of international environmental regime in the form of funding initiatives or "norm transfer". Typical actors in these categories include France, Sweden, German, Finland, The Netherlands, Norway, the European Union, UN, FAO, UNEP Nairobi, and World Bank.

However, the East Africa as a region has had a long history of cooperation. It has a significant body of regional agreements, partially regulating the use and development of

essential resources for socioeconomic development. An understanding of the creation of these regimes supplies important knowledge base for future sustainable governance of the basin resources. This regime creation analysis has identified factors that have driven the formation, orientation, and realization to help understand why it evolved, and in whose interests.

The three East Africa countries share Lake Victoria and its basin. As such, protection and restoration efforts in one country will be undermined if other portions of the lake continue with status quo. A holistic approach to the management of Lake Victoria is vital for the sustainable development of the basin (WB 1994). The creation of international environmental regime in the Lake Victoria Basin cannot be understood in isolation without first recognizing that the fish stocks are the basin's most important economic resource. The efforts on institutionalizing transboundary environmental governance in the basin started out by focusing on the fish resources.

Other driving factors to international environmental regime creation in the Lake Victoria basin include the lake's geostrategic position (Lautze *et al.* 2005), situated in between three countries and source of the River Nile, hydrologic developments, pressure and support from abroad by donor fraternity and colonial masters (in the form of third party intervention), poverty and the need for development funds. The European Union at one point banned temporarily the import of Nile perch from Lake Victoria for reasons of inadequate hygiene. All these factors gave impetus to the three partner states Kenya, Uganda and Tanzania to come together to identify regional norms, principles, rules and decision-making procedures to address the basin's environmental problems through the "regime" (the 1994 Agreement on

Preparation of Tripartite Environmental Management Programme for Lake Victoria (APTEMAP 1994)) That later evolved to the LV protocol.

The need for sustainable development of the Lake Victoria Basin ecosystem was re-articulated in the EAC Development Strategy 2001-2005. It is for that matter that the three member states of the EAC formed the Lake Victoria Development Programme (LVDP) in 2001. A vision and Strategy Framework for the Management and Development of the Lake Victoria was adopted the three partner states in 2003 (WB 2008). It states

"To have a prosperous population living in a healthy and sustainable managed environment providing equitable opportunities and benefits"

The three partner states proposed the Protocol for Sustainable Development of the Lake Victoria Basin (see Appendix 4) in 2001, which was signed in 2003 and ratified in 2004. Through the EAC Development Strategy 2006-2010, the Lake Victoria Basin Commission (LVBC) was established the under the LV protocol in 2005. Figure 4.1 is a summary of the major event on the basin environmental conservation.

Table 4.1 A chronology of environmental and natural resources conservation efforts in the Lake Victoria Basin

Date/Year	Event
1928	Kenya, Uganda and Tanzania recommend unified authority to manage of Lake Victoria fisheries.
1947	East Africa Fisheries Research Organization (EAFRO) formed to solidify collaborations for joint management of Lake Victoria fisheries.
1967	East Africa Community (EAC) formed to boost cooperation.
1970	The three East Africa countries become members of the FAO Committee for Inland Fisheries of Africa (CIFA).
1977	The East Africa Community (EAC) is dissolved.
1980	Strong need for collaboration on the management of Lake Victoria fisheries led to the formation of a Special CIFA Sub-committee to cooperate in the management of the Lake Victoria fisheries.
1992	Discussions to broaden regional environmental management of the Lake Victoria Basin started.
May 1994	The three members states Kenya, Uganda and Tanzania entered into Agreement to Prepare a Tripartite Environmental Management Programme for Lake Victoria (APTEMAP)
August 1994	A tripartite agreement (APTEMAP) signed
1997	East Africa treaty signed and found the East Africa Community (EAC) again.
1997	-Lake Victoria Fisheries Research Projected initiated. -LVEMP launched -Nile Basin Initiative brought in the EAC members for mutual benefit from development. The East Africa Community Organization for the Management of Lake Victoria (ECOVIC).
2001 2003	-East Africa Community –Lake Victoria Basin Partnership Agreement signed -Protocol for sustainable development of the Lake Victoria Basin initiated
2007	End of LVEMP phase 1
2009	Launch of LVEMP phase 2
2004	Protocol for sustainable development of Lake Victoria Basin signed
2005	The Lake Victoria Development formed, where LVEMP will be operating under.
2006	The Lake Victoria Basin Commission formed to take charge of all projects within the Lake Victoria Basin.

However, it is worth noting that the creation of international environmental regime in the Lake Victoria basin offers a unique contribution to the general literature on international environmental regimes. As indicated here, the creation of the regime borrows much from early colonial, pre-independence and post-independence international and regional

interventions in resource use and its consequences. Also, the influence of donor fraternity (World Bank, UN, FAO, IDA, EU, DFID, Britain, Norway, France and Sweden) and colonial masters (through the 1929/1959 Nile water Agreement) played a significant role in shaping the interests, knowledge and power, for international environmental regime and transboundary water management in the basin. The regime therefore reflects the "interplay" of all these forces with international agencies and partners being more powerful, followed by basin states, national elites (scientific actors), and barely, community members from the basin states.

Conclusion

The demand for creation of a regime in the Lake Victoria basin came after historical exploitation of basin resources for development. Early colonial and donor efforts were geared towards advancing natural resource exploitation for economic and food self sufficiency, particularly by improving fishing efforts and food production. International donor community played an important role in the foundation of resources exploitation activities by contributing financial and technical support in the expansion of agriculture and improved fishing for food self-sufficiency and for export to earn foreign exchange.

It later became clear the planning of such interventions had drastic environmental consequences. This chapter has traced this process to consequent efforts for regime creation in the basin drawing from changes that accompanied natural resources exploitation, both globally and regionally. Although Kenya, Uganda and Tanzania had a long history of natural integration as designated by geostrategic location of the Lake Victoria, it was apparent that

cooperation for region-wide environmental management was missing. Even though there were eminent environmental degradation problems, it is international/global efforts that eventually influenced regional and national efforts for environment and natural resources management in the basin. This came from efforts to address the global environmental change with particular reference to transboundary water.

This chapter has given a general characterization of the basin in terms of its geographical, socio-economic and environmental characteristics of the Lake Victoria basin and developed the general process on the progression to international environmental regime creation in the basin through documents and fieldwork interviews analysis. It traced in chronology order the politico-legal events at both global and basin levels on how cooperation for environmental management in the basin was created. The whole process is divided into early colonial, pre-independence, post independence and recent events relevant towards basin-wide cooperation for the creation of international environmental regime.

It specifically analyzed regime creation by exploring how problem factors during the process of cooperation for international regime creation were considered i.e. whether assessments for problem identification, problem conceptualization, problem contextualization, the problem pressure and problem solving were done. It has revealed the regime negotiation process by elaborating the negotiation process aspects of agenda setting, bargain mechanisms or negotiations, and signing of agreements in the basin.

The chapter has traced regime creation perspective from the analysis of problem and process factors at the international and regional/basin-wide levels. This approach is based on the

understanding that transboundary water resources matter at all levels including local, national, regional and international/global levels. It did not consider activities at the national level as its focus is on understanding regime creation for international environmental regime effectiveness in the Lake Victoria Basin.

The results suggest that the Lake Victoria basin regime is 'interplay' of the international and regional/basin-wide activities. In particular, the international activities influenced regional/basin-wide activities to address environmental degradation problem in the basin. These efforts led to signing of a framework international environmental politico-legal arrangement in the form of a tripartite agreement for the initiation of basin-wide environmental management programme the Lake Victoria Environmental Management Programme (LVEMP). The regime contained general sets of commitments which created frameworks for negotiation of more specialized accords in the form of framework-protocols to manage specific issues of natural and environmental resources degradation in the basin. The Agreement on Preparation of Tripartite Environmental Management Programme (APTEMAP) for Lake Victoria was therefore a multilateral environmental agreement that formed core for specific social institutions to cement the regime i.e. a persistent set of regional and international rules, including Operational Ordinances of funding agencies (formal and informal), that prescribed behavioural roles, constrained activity and shaped expectations.

The chapter has shown the process of "consolidation" and "diffusion" of politico-legal authority from the global scale to transboundary water basin level. In terms of consolidation, the regime has to bring together authority of stakeholders from all levels including sub-

national, national, regional and international. Such consolidation would be to identify the core values or norms. It is the diffusion process that would transfer knowledge of core values that would set the standard of behaviour.

This analysis of environmental regime creation in the Lake Victoria Basin sheds light on how RALP model (see Chapter 1) features as an important tool in the creation and understanding of an effective international environmental regime. The input stage or regime creation is crucial in determining the regime characteristics, identified through analyzing the regime architecture. The interpretation of problem factors during joint management was important in identification of the regime substantive characteristics, namely: norms, principles and rules. This analysis for regime creation could be useful to the international community for lessons on how to package authority to solve global problems at the regional/basin-wide level. The basin regime therefore acts as a good model for understanding what is happening at the local scale and therefore relevant for testing the effectiveness of global interventions at the local level. However, the findings suggest process factors rather than problem factors dominated the regime creation process. The architecture of the basin transboundary water regime is explored in the following chapter.

Chapter Five

CHAPTER 5

OUTPUTS: The Architecture of the Lake Victoria Basin regime

Introduction

Chapter 4 has shown how the regime was created. Unlike many multilateral environmental agreements which set a threshold beyond which interference will not be permitted, the regime established a programme for managing the lake and its basin. It therefore provides the key long-term objectives of environmental management for sustainable development in the basin. As such, the regime provides a source to analyze the architecture governing environmental management in the basin. This chapter establishes regime characteristics by exploring the regime instruments, namely: APTEMAP, the EA Treaty, and the LV Protocol including some reflections on global conventions ratified by the basin member states.

The regime instruments are decomposed and synthesized for two broad categories of regime characteristics, namely: the *procedural* and *substantive* characteristics. Procedural characteristics relate to those procedural principles, procedures and practises, while substantive characteristics are those goals (norms), principles, rights and obligations and rules that govern conduct in the basin (see Chapter 2, Table 2). These constitute the main legal elements that guide the transfer of authority for environmental management in the basin.

This chapter proceeds as follows. Firstly, it explores the substantive characteristics of the APTEMAP and related instruments by identifying the goals (norms), the general principles, the rights and obligations and the rules of the regime. Secondly, it stipulates the procedural characteristics by identifying the procedural principles, the procedures and the practices and the organization. Thirdly, it explores a global contextualization of the environmental regime

in the basin, and gives a summary of the regime architecture. It is after this summary that it provides a discussion of the transboundary water regime in the basin, and lastly draws conclusion on the nature of the regime architecture.

The substantive characteristics of the regime: an overview

This section explains the legal and moral nature of the basin regime by identifying substantive characteristics of the regime i.e. its ultimate goals or norms, principles, and rules. The regime instruments were decomposed and synthesized for these characteristics. Whereas, the basin member states: Kenya, Uganda and Tanzania, had signed a tripartite agreement to strengthen regional cooperation i.e. the Agreement for the Establishment of a Permanent Tripartite Commission for the Co-operation (AEPTCC) among them, in Arusha on 30th November, 1993, they realised that their co-operation was missing transnational environmental commitments intended to solve problems facing the Lake Victoria Basin. They therefore agreed to sign APTEMAP to recognize that their *regional cooperation had an essential component on the environmental management of the Lake Victoria* (paragraph 8, APTEMAP preamble).

Realising that cooperation was important the three member states considered re-establishing the then defunct East African Cooperation that collapsed in 1977 due to political differences among the then heads of governments. Thus, the Treaty for the establishment of East Africa Community (EA Treaty) by the Republic of Kenya, United Republic of Tanzania and republic of Uganda in Arusha Tanzania was found on the November 30th 1999 and entered into force on the July 7th, 2000.

Chapter 19 of the EA Treaty calls for cooperation in environment and natural resources management. This chapter of the treaty was found to be too broad in attaining specific sustainable development goals in the Lake Victoria and its basin. As a way to strengthen their cooperation, the member states designated the Lake Victoria basin as a common 'economic growth zone' and through a regional sectoral council formed under EA Treaty, the Protocol for Sustainable Development of Lake Victoria Basin was established and signed in 2003. This protocol established a body for the management of the Lake Victoria: the Lake Victoria Basin Commission,[10] where LVEMP is based. This analysis realized that, the substantive elements of APTEMAP proved robust even during the 'shift' from the framework agreement (APTEMAP) to LV Protocol. The following sub-sections explore the substantive characteristics of the basin regime.

The norms of the regime

Norms are significant at all levels of decision making in environmental management (Earth Governance Systems Project 2008). They form a primary component of any governance architecture as they "influence regime creation and shape governance" (*Ibid*). Regime norms are those standards of behaviour set by stakeholders in a given to govern issue specific area. According to Kratochwill (1998) they are beliefs about social rules and conventions, including about the world and laws of science. Thus norms include beliefs about what is right and proper and encompass thought about the future (*Ibid*). Apparently regime norm can not be just one, unless coupled.

[10] As established by Article 33 (1) Lake Victoria Protocol and Article 114 (2b)iv EA Treaty

The Convention on Biological Diversity (CBD, article 5) stresses the:

> "importance of, and the need to promote, international, regional and global cooperation among states" (paragraph 14, preamble), and requires parties to as far as possible and as appropriate, cooperate with other contracting parties …. on…. matters of mutual interest, for the conservation and sustainable use of biological diversity"

Cooperation formed the first standard of behaviour to jointly manage the basin. However, as established by Article 3 of the LV Protocol 2003, its scope in the basin was broad. The partner states agreed to cooperate in areas related to the conservation and sustainable utilization of the resource of the basin. In the water sector, the member states agreed to cooperate for sustainable development, management, and equitable utilization of water resource, including fisheries resources. This included promoting sustainable agriculture and land-use, and sustainable development and management of forestry resources and wetlands. They also agreed to promote trade, commerce, and industrial, including infrastructure and energy. The cooperation was to maintain navigational safety and maritime security, and improve public health (sanitation). Research, capacity building, and information exchange for environmental protection and management were to form common agenda in the basin. Further, aspects of cooperation included public participation in planning and decision-making and integrating gender concerns in all activities. and promote wildlife conservation and sustainable tourism development.

However, as may be realised from the above Article of the LV Protocol 2003, the regime instruments made broad statements regarding standards of behaviour to attain various goals in the basin. The role of this analysis therefore was to synthesize statements of fundamental

value meant to guide conduct in the basin. As such, the main regime norm in the basin may be stated as follows:

> "joint and efficient environmental management for equitable and reasonable use of the Lake Victoria basin resources for sustainable development of the partner states, including basin communities" (As established by APTEMAP paragraph 1 and 8; EA Treaty Article 114(2b)i-vi.).

This norm is supported by statements of fundamental value agreed upon by the partner states such as:

> *"Water is a finite and vulnerable resource essential to sustain life, development and environment and must be managed in an integrated and holistic manner"*, (preamble paragraph 4, Lake Victoria Protocol for Sustainable Development in 2003).
>
> And
>
> "aware of the environmental importance of Lake Victoria and its significance to the sustainable development of the riparian countries" (paragraph 3, APTEMAP preamble).

There are various statements of standard of behaviour scattered in many parts of the regime instruments. These are summarized here as sub-norms that include the following.

Joint *management* as a form of strengthening regional cooperation is identified by this analysis as the first norm.[11] Joint management of water resources has been considered a principle than a norm in most water resources studies.[12] Joint management was stipulated in the APTEMAP (paragraph 8 preamble), the EA Treaty (article 111 (1a)) and the Lake

[11] Article 111(2d) EA Treaty
[12] Source?

Victoria Protocol (paragraph 5, preamble), the basin is to be managed as a unit under one regional body (EA Treaty, article 114 (2b)iv), constituted by the basin states experts (also see Article 9(2) 1992 Water Convention).

Paragraph 8 of the preamble recognises regional cooperation as an essential component for the environmental management of the Lake Victoria, and being in the process of establishing the Lake Victoria Fisheries Organization to jointly manage the fisheries resources of the lake. It is in the same understanding that, the EA treaty established in Chapter 19 that "Partner states agreed to take concerted measures to foster cooperation for the joint and efficient management and sustainable utilization of natural resources within the community for the mutual benefit of the Partner states (Article 114(1)). As such, Kenya, Uganda and Tanzania created a programme to manage environmental issues in the basin.

The second norm was *to maintain the environmental value of the lake for sustainable development*.[13] The partner states recognized the environmental importance of Lake Victoria and its significance to the sustainable development (paragraph 3). This implied, all the basin states had an obligation to maintain the environmental value of the lake. The three states were also concerned with the levels of fisheries resources exploitation in the Lake Victoria and recognized they were close to the limits of sustainable yield (paragraph 4). With an estimated income of about US $400 Million per year, the lake fisheries form an important foreign exchange earner to the riparian states and communities. Thus, losing this income due to environmental degradation was one of the unimaginable consequences that had to be prevented at all costs.

[13] para. 3,4,5,6, APTEMAP preamble; para. 8, preamble, the LV Protocol

The third norm was to *maximize the benefits by maintaining sustainable yield for food security and socio-economic development* (paragraph 10, APTEMAP preamble). The three partners recognized the socio-economic and environmental importance of the Lake Victoria (paragraph 3) and decided to maximize the benefits by maintaining sustainable yields for food security and socio-economic development. As such, they designated the Lake Victoria basin as an 'economic growth zone' (paragraph 8, LV protocol). Food security is crucial in the basin and the main activities in the basin are focused on resource exploitation for food production (i.e. in both fisheries and agriculture). The basin is endowed with fertile soils and receives good amounts of rainfall. Thus, is conducive for food production to meet the needs of the basin's fast growing population. However, deforestation for agricultural production has been on the increase.

The fourth norm was to *reduce detrimental development and use effects on ecological system of the lake by recognize the value in wetlands and realization of significant changes*. The increase in agricultural and urban run-off, including discharge of domestic and industrial waste into Lake Victoria adversely affected the ecological system of the lake (para 5). As stated earlier on, agricultural, domestic and industrial waste discharges are increasing due to the expanding agricultural activities in the catchment.

There is use of agrochemical such as fertilizers, herbicides and pesticides whose final deposition is in the lake. This has caused eutrophication that has led to invasive weeds infestation of the lake. Also, member states were concerned with the conversion of wetland areas around the lake for agricultural and /or other uses could have detrimental effects on the lake ecosystem (para 6).

At the global scale, the basin is recognized as a Ramsar site. The three member states: Uganda, Kenya, and Tanzania ratified the Ramsar Convention 1971. According to the convention, member states recognize the fundamental ecological function of wetlands as regulators of water regimes and as habitats supporting flora and fauna, especially waterfowls. The convention defined wetlands "as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres" (Article 1 (1)).

Article V of the convention state that, contracting parties shall consult each other about implementing obligations from the convention especially in the case of a wetland extending over the territories of more that one contracting party or where a water system is shared by contracting parties. They shall at the same time endeavour to coordinate and support present and future policies and regulations concerning the conservation of wetlands and their flora and fauna (Article 5 (1). The wetlands around Lake Victoria act as sieve for excess nutrients into the lake. Unchecked destruction of wetlands therefore means destruction of nutrient sieves, resulting into eutrophication due to nutrient loading of the lake.

Fifth norm was to *understand the consequences of poverty and poverty alleviation, for environmental management of the lake and its resources* (paragraph 9, APTEMAP preamble): The partner states recognized that poverty is both a cause and a consequence of environmental degradation and must therefore be addressed adequately in order to enhance equitable and sustainable development among riparian communities (paragraph 9 of the APTEMAP Preamble).

According to 1992 Rio Declaration, Paragraph 4 Preamble, most of the environmental problems in developing countries are caused by under-development. Millions of people live below minimum levels required for decent human existence: deprived of adequate food and clothing, shelter and education, health and sanitation. The Rio Declaration 1992 proclaimed that, man is both a creature and moulder of his environment that gives him physical substance and affords him the opportunity for intellectual, moral, social and spiritual growth. As such, the protection of the environment is a major issue that affects the well-being of the people and economic development throughout the world. It was therefore the desire of the people of the world and the duty of all governments to protect the environment for poverty alleviation.

Sixthly, *harmonization of national regulations andto build national institutional capacity:* This norm is originally stated in Paragraph 12b, APTEMAP preamble. It states that

> "... to this end it requires national capacity building by using and strengthening existing institutions to conduct on a sustainable basis, ongoing and additional functions under regional programme".

It is further stated in the EA Treat Article 111(1b), which states that "... to attain this strategy, partner states agreed to cooperate and *coordinate* their policies and actions for the protection and conservation of the natural resources and environment against all forms of degradation and pollution arising from development activities. As such the partner states agreed to adopt common policies and regulations for the conservation, management and development of fisheries resources (Article 114(2b)ii).

For the Lake Victoria, the treaty calls for the establishment of common fisheries management and investment guidelines (Article 114(2b)iii), and the establishment of a body for the

management of Lake Victoria (Article 114(2b)vi). Article 112 (1a) asserts that, common environmental management policy is required to sustain the ecosystem to prevent, arrest and reserve the effects of environmental degradation".[14]

The principles of the regime

Principles refer those beliefs of fact causation and rectitude,[15] and establish the future implications of commitments. To include principles in a regime, one need to know "their substantive meaning as well as their legal implications" and "state practice" (Yamin and Depledge 2004:66). The nature and scope of the environmental principles in the Lake Victoria basin indicate their broad relevance.

A synthesis for principles in the regime instruments revealed they appear in various parts of the three documents. The protocol adapted an open ended set of principles, perhaps 'jettisoned'[16] from the Agreement, the Treaty, and other international environmental and water conventions. The principles of the basin regime can be summarized as: equitable use (paragraph 8 and 9: APTEMAP Preamble); the principle of reasonable use (paragraph 5, 6, and 7); the principle of maximum sustainable yields or benefits maximization, poverty eradication (paragraph 4), integrated management of resources (paragraph 11); and the principle of sustained long-term effort (paragraph 12); national capacity building and strengthening of existing institutions (paragraph 12); and pursuing sustainable development.

However, the LV Protocol identifies four main principles amongst many outlined sub-principles, namely: the principle of equitable and reasonable use (Art. 5); the principle of

[14] See APTEMAP Article 2.
[15] See Chapter 2: Regime outputs
[16] See Yamin and Depledge 2004: 67; the international Climate Change Regime.

protection and conservation of the basin and its ecosystems (Art. 6); the principle of sustainable development of natural resources (Art. 7); the principle of sustainable development and management of fisheries resources (Art. 8); and the principle of sustainable agriculture and land use practices. These are explained here.

The principle of equitable and reasonable use (Article 5)

This principle is stated in paragraphs 4, 5, 6, 9, and 10, APTEMAP preamble; and Article 5 the LV Protocol 2003**.** Paragraph 4 states that, partner states are "concerned that the present levels of the fisheries resources of the Lake Victoria may be close to the limits of the sustainable yield of the lake fishery". The partner states were concerned that "increased agricultural and urban run-off, discharge of domestic and industrial waste into Lake Victoria adversely affects the ecological system of the lake" (paragraph 5). They recognized that, "the conversion of wetland areas around Lake Victoria for agriculture and/or other uses may have detrimental effect on the lake ecosystem" (paragraph 6). They also accepted that "poverty is both a cause and a consequence of environmental degradation and must be addressed adequately in order to enhance equitable and sustainable development among riparian communities" (paragraph 10).

The principle of protection and conservation of the basin and its resources (Article 6)

Article 6(1) states that, "the partner states shall take all appropriate measures, individually or jointly and where appropriate with participation of stakeholder to protect, conserve and where necessary rehabilitate the basin and its ecosystem". They identified the following as main areas of application: "protecting and improving water quality within the basin" (1a); and

"preventing introduction of species alien or new into the basin water resources which may be detrimental to the ecosystem" (1b).

The member states approved "to identify the components of and developing strategies for protecting and conserving biological diversity within the basin" (1c). As such, decided "to conserve migratory species of wild animals" (1d); "conserve endangered species of wild fauna and flora" (1e); "protect and conserve wastelands"; and restore and rehabilitate degraded natural resources and conserve fisheries resources within the basin.

According to *the principle of Sustainable development of natural resources (Article 7),* the partner states agreed "to manage, develop and utilize the natural resources of the basin in sustainable manner". Similarly, in *the principle of Sustainable development and management of fisheries resources* (Article 8), the partner states agreed "to manage, develop and utilize fishery resources of the basin in accordance with convention establishing the LVFO". Also on the principle of *Sustainable agriculture and land use practices* (Article 9), the member states approved "to promote agriculture and land use practices in order to achieve food security and rational agricultural production within the basin". These principles are also stated in articles 105, 106,107,108,109 and 110 of the EA Treaty 1999.

The rules of the regime

Regime rules, relates to those specific prescriptions or proscriptions for action, that serve related mitigation functions of standard setting, distribution, information, enforcement and knowledge generation (Porter and Brown 1991). They can be softer and more informal in character and any institution can develop a set of understandings and accepted practises that supplement its more formal rules. However, identifying such rules can be difficult problem

(*Ibid*). Rules are usually codified in formal agreements, scattered in various parts without special reference as rules. As such, identification and categorization of rules depend on the analyst. This synthesis considered those regime statements that serve the mitigation function and relate to the function(s) of the regime.

Rules are those agreed commitments that require action to control environmental degradation or those that enhance the virtue of resource and environmental conservation in the Lake Victoria Basin. They include 'requirements to adopt particular policies and/or measures. When framed in quantitative terms, they include particular prescribed quantified targets to be achieved within specified time-frame. The synthesis arrived at the following categories of regime rules/measures for the Lake Victoria Basin.

Joint management measures

Joint management is considered a proscription for basin members to attain efficient environmental management of the basin. According to Article 1 APTEMAP, the parties agreed to initiate and implement a five-year programme to strengthen regional coordination in the management of Lake Victoria resources, including fisheries, water, and other resources (article 1(1)). Chapter 19 of the Treaty establishes that "partner states shall take concerted measures to foster cooperation in the joint and efficient management and sustainable utilization of natural resources (Article 114(1)).

As such, the states agreed to establish and adopt common regulation in the following areas: management and development of marine parks, reserves, wetlands and controlled areas

(Article 114(2b)i EA Treaty); the conservation, management and development of fisheries resources (Article 114(2b)*ii*); and common fisheries management and investment guidelines (Article 114(2b)*iii*). Thus they approved to establish a body for the management of Lake Victoria (Article 114(2b)*vi*), "to prevent, arrest, and reserve the effects of environmental degradation" (Article 112 (*1a*)).

Precautionary measures

As a mitigation measure, the partner states agreed to provide *prior and timely notification* and *relevant information* to each other on natural and human activities that may or are likely to have significant transboundary environmental impacts and to consult with each other at an early stage (article 111(1d)). The *obligation to notify* other member states, was to apply as a rule when riparian state intended to carry out new activities that might affect member states within the basin. As such they agreed to set *notification procedure* in state practice through *access and exchange of information;* and through *development and promotion of capacity building* (article 111(1e), EA Treaty). All these aspects required measures for *sustainable long-term effort* (see paragraph 12, APTEMAP preamble).

The procedural characteristics of the regime: an overview

Procedural characteristics in essence refer to those processes aimed at advancing preparatory efforts to address the problem of environmental degradation in the basin. They are capable of effecting regime targets and generate information necessary for taking more substantive characteristics. The process of 'strengthening substantive characteristics evolves in tandem with that of strengthening procedural characteristic' (Yamin and Depledge 2004: 75). Procedural characteristics stipulate the standards of care agreed upon by the partner states.

Procedural characteristics include those procedural principles, the procedures, practices, and the organizational basis of action that seek to attain the substantive characteristics of the regime (see Chapter 2). These are synthesized from the regime instruments and are explored here.

The procedural principles

Procedural principles are those facts causation and rectitude that guide the activities to be taken by the stakeholders in the process of solving the basin environmental problems (see Chap.2). They set the goals or the standards of care in the action plans for attaining substantive characteristics. As such, help states and non-state actors to more easily meet their obligations of substance (see Lang 1999:165)**.**

In the Lake Victoria Basin, procedural principles are identified in the Preamble of the APTEMAP. The partner states agreed to the following procedural principles namely: joint management through comprehensive long-term based basin programme (i.e. common but differentiated responsibility); holistic/integrated environmental management programme (paragraph 12, the APTEMAP); benefit maximization (paragraph 10); integrated management of resources (paragraph 11); national capacity building and strengthening of existing institutions (paragraph 12). Again, the EA Treaty identifies procedural principles and the procedure for attaining cooperation in environmental and natural resources management (see Article 111). These procedural principles are explored here.

Firstly, the *principle of common but differentiated responsibility for comprehensive long-term environmental management*: This procedural principle emerged as a principle of international environmental law and finds its origins in equity considerations and equity principles of

international law. The partner states recognized that development activities may have negative impacts that may lead to the degradation of the environment; and depletion of natural resources. They acknowledged that a clean and health environment is a prerequisite for sustainable development (Article 111(1) EA Treaty).[17]

This principle forms the foundation for the norm and principle of joint management. By agreeing on common responsibility in the form of an environmental management programme for the basin, the partner states were actually basing their reasoning on the shared nature of the Lake Victoria as a shared resource that required joint management.

Differentiated responsibility as a procedural principle is in resonance to the principle of sovereignty. Whereas the Lake Victoria is a shared resource, its catchment is not. The catchment area or the basin distinctly belongs to specific sovereignty (the partner states). Again as Principle 2 of the Rio Declaration provides on State sovereignty,

> "States, in accordance with the Charter of the United Nations and principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or areas beyond the limits of national jurisdiction."

As such, the management of the Lake Victoria Basin is the responsibility of the partner states. In pursuant of this principle, states must observe the procedural principle of common but differentiated responsibility.

[17] See APTEMAP, para. 3 Preamble

Secondly, joint management is an imposed procedural principle by World Bank and donor agencies. To some extent this principle is considered procedural due to the operational directives of the World Bank. To secure funding, the partner states had a duty to development a joint environmental management programme. The partner states agreed to take concerted measures to "foster cooperation.

According to Principle 7 of the Rio Declaration

> "... States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command."

This principle points to key procedural characteristics. Firstly, common responsibility arises from the concept of common heritage and common concern for mankind which points to the duty of equal sharing of the burden of environmental protection of transboundary water resources. Secondly, differentiated responsibility addresses substantive equality in terms of unequal resources, social and economic situations across states and political influence or interference in tackling environmental problems.

In the Lake Victoria basin this procedural principle is seen in partitioning of activities across spatial and temporal dimensions in the form of a staggered programme approach, managed under specific country secretariats.

Thirdly, benefit maximization in the Lake Victoria basin is stated as a standard of care. The desire of partner states for integrated and sustainable utilization was to maximize the accrued benefits to the riparian countries including basin communities (Paragraph 10 APTEMAP

preamble). This was a procedure principle to fulfil the ‘principle of poverty alleviation’. The basin states recognized that poverty is both a cause and a consequence of environmental degradation and must therefore be addressed adequately in order to enhance equitable and sustainable development among riparian communities (Paragraph 9 APTEMAP). This therefore made the principle of benefit maximization a procedural principle to reducing poverty in the basin.

Fourthly, Precautionary principle relates to ‘caution in advance’ (Shaw 2008). Its aim is to provide guidance in cases of scientific uncertainties and where risks are unknown. It is an evolving moral and political principle of international environmental law. It features in the three instruments of basin regime. It guides decision-making and anticipates actions taken or going on will affect the environment and human health. The basin regime is a precautionary concern.

The principle is stated in Paragraphs 4, 5, 6, 7, 9 and 12 APTEMAP Preamble; Articles 4(2e), 112 (1)&(2) of the EA treaty; and Article 16, the LV protocol (see Apendices 2,3 & 4). It requires states not to advance scientific uncertainty as a reason not to take action to prevent environmental degradation. Paragraph 5 asserts that the member states were further concerned with increased agricultural and urban run-off, discharge from domestic and industrial waste into Lake Victoria that adversely affects the ecological system of the Lake. In paragraph 7 the partner states recognized that, the conversion of wetland areas around Lake Victoria for agricultural and/or other uses may have a detrimental effect on the lake ecosystem.

The EA Treaty (Article 111) states that "the partner States recognize that development activities may have negative impacts on the environment leading to degradation of the environment and depletion of natural resources and that clean and healthy environment is prerequisite for sustainable development". It is for this reason that the member states agreed to take action to preserve, protect and enhance the quality of the environment. Article 114(b)vi calls for the establishment of a management body for the Lake Victoria basin.

In the same capacity, the Lake Victoria protocol (Article 4(2)f) calls on member states to take all measures to prevent *serious or irreversible harm* to the environment despite lack of full scientific certainty regarding the nature and extent of the threat. Other related principles include those of prior notification and information exchange (EA Treaty article 111 (d); and principle 19 Rio Declaration 1992).

Fifth, the principle of intergenerational equity is stated in Paragraph 9, APTEMAP preamble; and LV protocol Articles 4 and 5. It includes the principle of eradication of poverty (paragraph 9APTEMAP preamble; Principle 5 Rio Declaration 1992). According to the partner states, eradication of poverty is seen as a principle for environmental management in the basin. The partner states recognize poverty as both cause and consequence of environmental degradation. They assert that to enhance equitable and sustainable development among riparian communities, poverty must be addressed adequately.

Sixth, Precautionary approach: the LV protocol Article 16 provides the monitoring and precautionary measures. It states that each partner state shall, within its jurisdiction, monitor activities and natural phenomena with a view to determining the potential risk they pose to the resources of the Basin and its people (article 16 (1)). Partner states shall adopt

standardized equipment and methods of monitoring natural phenomena (article 16(2)) and where there is threat to the environment, partner states shall undertake such precautionary and pre-emptive measures as may be necessary in the circumstances (article 16(3)).

Seventh, the principles of prior notification and information exchange: These are based on the virtue of precautionary principle: to employ the duty of care to avoid significant harm. Prior notification is used as a precautionary measure on intended development activities to avoid significant harm. They complement the principles of common but differentiated responsibility and equitable and reasonable use, including all procedural principles in attaining the norm of joint management. These principle complements the due diligence procedure by sharing information and notices on development interventions that have detrimental effects on the environment. They are based on the precautionary approach of environmental assessment.

Paragraph 5, APTEMAP establishes that states were concerned that increased agricultural and urban run-off, discharge of domestic and industrial waste into the Lake Victoria adversely affected the ecological system of the lake. Through environmental assessments, partner states were to inform each other of intended development activities and their accrued consequences. Prior notification and information exchange were therefore important procedural principles in the basin. The EA Treaty article 111(1d) established that, states shall provide prior and timely notification and relevant information to each other on natural and human activities that may or are likely to have significant transboundary environmental impacts and shall consult with each other at an early stage.

According to Principle 19 Rio Declaration 1992,

> States shall provide prior and timely and relevant information to potentially affected states on activities that may have significant adverse transboundary environmental effect and shall consult with those states at an early stage and in good faith.

As such, prior notification and exchange of information places three-tier 'duty of care' on states. Firstly, calls for a duty of states to provide information on activities that may have adverse transboundary environmental effect. Secondly, states have a duty to consult with each other or experts on activities with significant effects. Lastly, prior notification to be done at early stages, i.e. through environmental assessments and audits (EA Treaty; LV protocol; RIO principle 17; CBD principle15); monitoring and compliance (EA Treaty; LV protocol; CBD principle 19) and access to information (EA treaty; CSD, Principle 14).

The1997 UN Water Convention (Articles 11-19) provides detailed notification procedure that include notification upon request (Art 18(1)); and as per the terms of reference stipulated in the Convention on Environmental Impact Assessment in a Transboundary Context 1991 (Article 3(7)). The UN Water Convention 1997 requests for suspension of works for a period of six months, unless otherwise agreed (Art18 (3)), and for 'timely notification' (Art.12).

Other identified procedural principles include: capacity building (para 12, Aptemap preamble; EA Treaty111(1e); Rio Principle 9); public participation (EA Treaty; Rio Principle 10; CSD principle 13); The principle of integrated management (paragraph 11, APTEMAP preamble; and article 112(1e) EA Treaty); The principle of effective legislation (i.e. harmonization of legislation and commitments EA Treaty; LV protocol; RIO principle 11; CBD principle 18); and strengthening of existing institutions; and the principle of

sustained long-term effort, also referred to as the principle of sustainable development (paragraph 12, APTEMAP preamble: Article 4(2b), LV protocol; Article 114(2b)iv, EA Treaty).

The procedure

The procedure refers to the planning of activities meant to implementing the regime. It is based on a set strategic action plans to attain the regime targets. In the basin, the parties agreed to initiate and implement a five-year programme to strengthen regional co-ordination in the management including fisheries, water, and other resources. (Article 1(1), APTEMAP). The aim of the programme (LVEMP) was to rehabilitate the lake ecosystem for the benefit of the people who live in the catchment, the national economies of which they are part, and the global community (LVEMP I, 1996 proposal).

The program had the following objectives. Firstly, it was to maximize the sustainable benefit to riparian communities from using resources with the basin to generate food, employment and income, supply safe water, and sustain a disease free environment. Secondly, to conserve biodiversity and genetic resources for the benefit of the global community, and lastly, to harmonize national management programmes in order to achieve, the maximum possible the, the reversal of increasing environmental degradation (*Ibid*).

The practice

Practice refers to the approach in which activities were taken. The phase 1 of LVEMP was to provide the necessary information to improve the management of the lake ecosystem, establish mechanisms for cooperative management by the three countries, identify and

demonstrate practical self-sustaining remedies, while simultaneously building capacity for ecosystem management. The practice consisted of two main sets of activities. The first set was designed to address specific environmental threats, which took place in a series of pilot zones. The second set of activities, on a lake wide-scale, was to improve information on the lake and build capacity for more effective management.

Through pilot zone approach, a total of fourteen pilot zones were identified (four in Kenya; five in Tanzania and five in Uganda. Work was to start in one pilot zone in each country in the first year. The aim was to develop groundwater resources; conserve and develop wetlands; reduce sediment and nutrient flow into the lake; reduce faecal coliform and municipal nutrient output into the lake; regulate industrial effluent; define contamination of fish and prevent further increase. It also had a duty of stabilizing the catch of Nile perch, and increase catch of indigenous species thus increase income of local fisherfolk. It was also to reduce water hyacinth to manageable levels.

The set of lake-wide activities were to include the following. Firstly, to assess and measure sources of nutrients causing eutrophication, measure fisheries-trophic state interactions, model and monitor lake circulation. These activities were to define and measure the contaminant threat; harmonize regulation and legislation; monitor recovery and impact; and build institutional capacity. The output from these activities was to support regional and national programme activities that included, management of fisheries; the establishment of the Lake Victoria Fisheries Organization; improvement of fisheries research and the information base for fisheries; and strengthening of extension, monitoring and enforcement capabilities of national fisheries administration.

Secondly, to manage lake pollution and water quality. The practice was including, strengthening and harmonization of national regulatory and incentive frameworks; and enforcement capabilities; and establishing a lake-wide water quality monitoring system. The expected output was to include, improvement of research and the information base for pollution control and water quality. The three member states were to pilot investments in industrial and municipal waste management, and priority waste management investment.

Thirdly, they were to manage wetlands including improvement of information base and pilot investment in sustainable management of wetlands products. Fourthly, they were to manage and control water hyacinth infestation and fifth, to manage land use in the catchment, including improvement of research and the information base for pollution loading from the catchment. They were to use assess the use of agro-chemicals and pilot investments in soil conservation and afforestation. Lastly, support policy initiatives, institutions for lake-wide research and management, and pollution disaster contingency planning (Paragraph 27).

The organizational basis of action

The three partner states proposed a staggerred programme to be implemented along critical path system (Article 1 APTEMAP). The parties agreed to initiate and implement a five year program to strengthen regional co-ordination in the management of the Lake Victoria including fisheries, water, and other resources (Article 1 (1)). The organizational arrangement was established in Article 2 of the Agreement, the parties established a Regional Policy and Steering Committee and two Regional Task Forces (Article 2 (1)).

The organizational framework as stipulated in Articles 2 and 3 of the Agreement, constituted two regional task forces. Firstly, regional task force was to prepare proposals for the fisheries

management and control of water hyacinth and other invasive weeds. Secondly, was to prepare proposals for the management of water quality and land use including wetlands. Tanzania was to head the regional policy and steering committee assisted by a regional secretariat (Article 2 (1)), the committee was to offer policy guidelines and overall regional coordination of the programme preparation. Uganda was mandated as the lead country for the preparation of programmes fro regional task force on fisheries management and control of water hyacinth and other invasive weeds.

The Lake Victoria Sub-committee on Inland Fisheries in Africa (CIFA) was given the mandate to undertake these functions (Article 2 (1b)). Kenya was to prepare a programme for the management of water quality management and land use including wetlands. Each country established a secretariat and two national working groups, one for each task force and appointed national consultants to assist the working groups (Article 2 (4)).

As observed by Rutagema (2008), Director Ministry of Water and Irrigation, Mwanza, Tanzania, the programme was split into the following programme components, namely: fisheries research and management; water hyacinth control; land use and wetland management. The water quality management component included three subcomponents, namely: management of industrial and municipal waste, management of eutrophication, and management of pollution loading. It was also to undertake catchment management and soil and water conservation. Other components include capacity building; micro-finance; community participation and coordinating of secretariats. These activities were to be piloted in 14 pilot zones but work was started in three pilot zones i.e. one pilot zone per country, namely: Nyakach bay in Kenya, Napoleon gulf in Uganda, Mara-Shirati bay in Tanzania.

Five fish landing sites were to be gazetted in each zone for harmonization of national fisheries legislation, monitoring and enforcement, and strengthening of fisheries extension.

The environmental regime in Lake Victoria Basin: a global context

This analysis of regime characteristics in the Lake Victoria Basin can not end without mentioning other sources of substantive characteristics, in particular from the United Nations conventions, international development partners, and donor agencies. In 1970 United Nations commissioned its own legal advisory body, the international Law Commission to codify law on the non-navigational use of international watercourses. These efforts took more than two decades to accomplish its task. The World Bank and international partners, especially EU and UN influenced the substantive and procedural elements of the regime. These global instruments are explored here in terms of their contribution of substantive and procedural characteristics for the regime architecture.

Regionally the World Bank and the GEF, through their operational directives and goals, imposed funding conditions to the partner states in initiating the environmental management programme in the basin. The influence of these agencies significantly influences regime architecture. In the Lake Victoria basin, the regime was founded with significant input from these funding agencies. The operational directives, goals and objectives of the actors tend to influence the substantive elements of the regime; as such they become a 'cocktail' of stakeholders' goals and interests.

The global norm

For instance, the 1992 Helsinki Convention on the Protection and use of Transboundary Watercourses and International Lakes. It strengthens national measures for the protection and management of transboundary water. The convention stipulates crucial mandate on international lakes governance in its Part II, it states the provisions relating to riparian parties. Article 9 stipulates the 'rules' or provisions pertaining to bilateral and multilateral cooperation. It states 'The Riparian Parties shall on the basis of the equality and reciprocity enter into bilateral or multilateral agreements or other agreements, where these do not yet exist, or adapt existing ones, where necessary to eliminate the contradictions with the basis principles of this convention, in order to define their mutual relations and conduct regarding the prevention, control and reduction of transboundary impacts'. The parties were to specify the catchment area, or part(s) thereof, subject to cooperation. These agreements or arrangement shall embrace issues covered by the convention as well as other issues on which the riparian parties may deem it necessary to cooperate (Article 9, 1). The agreement mentioned here shall provide for the establishment of joint bodies.

The global procedural principles

Article 9(2) stipulates the tasks of joint bodies as follows: These bodies shall collect, compile and evaluate data in order to identify pollution sources likely to cause transboundary impact (article 9, 2a). They shall elaborate joint monitoring programmes concerning the quality of water and quantity (Article 9, 2b); to draw up inventories and exchanges information on pollution sources (Article 9, 2c); they shall elaborate emission limits for waste water and evaluate the effectiveness of control programmes (article 9, 2d); to elaborate joint water quality objectives and criteria and propose relevant measures for maintaining and, improving

the existing water quality (Article 9, 2e). Joint bodies shall develop concerted action programmes for the reduction of pollution loads from both point sources (Municipal and industrial sources) and diffuse sources (particularly from Agriculture) (Article 9, 2f); to establish warning and alarm procedures Article 9, 2g); to serve as a forum for exchange of information on existing and planned uses of water and related installations that are likely to cause transboundary impact (article 9, 2h); and to promote cooperation and exchange of information on the best available technology in accordance with the provisions of article 13 of the Convention (Exchange of information between riparian parties), as well as encourage cooperation in scientific research programmes (article 9, 2i) and lastly, to participate in the implementation of environmental impact assessment relating to transboundary waters, in accordance with appropriate international regulations (Article 9, 2j).

The global procedural principles

Article 2 *(1-4)* states the rights and obligations relating to all the parties. It states, Parties shall take appropriate measures to prevent, control and reduce any transboundary impacts (Article 2, *1*), control and reduce pollution of waters causing or likely to cause transboundary impact" (Article 2, *2a*), to ensure that transboundary waters are used with the aim of ecologically sound and rational water management, and conservation and protection of water resources and environment (Article 2,*2b*). This is to ensure that transboundary waters are used in a reasonable and equitable way, taking into particular account their transboundary character, in the case of activities which cause or are likely to cause transboundary impact (Article 2,*2c*), they will ensure conservation and where necessary restoration of ecosystems (Article2, *2d*). Further rules among parties include measures to prevent, control, and reduce of water

pollution should be taken where possible at source (Article2, *3*) and the measures should not directly or indirectly transfer pollution to other parts of the environment (Article 2, *4*).

The global procedure

Article 3 expound the rules further by identifying specific approaches to prevent, control and reduce transboundary impact in international lakes. These include Article 3, 1 states that parties shall develop, adopt, implement relevant legal, administrative, economic, financial and technical measures, in order to ensure, inter alia, that the emission of pollutants is prevented, controlled and reduced at source through application of , *inter alia*, low-and non waste technology (Article 3, *1a*).

Transboundary waters are protected against pollution from point sources through the prior licensing of waste-water discharges by the competent national authorities, and that the authorized discharges are monitored and controlled (Article 3, *1b*). The limits for waste water discharges stated in permits are based on the best available technology for discharges of hazardous substances (Article 3, *1c*).

Stricter requirements, even leading to prohibition in individual cases, are imposed when the quality of the receiving water or the ecosystem so requires (Article 3, 1d). At least biological treatment or equivalent processes are applied to municipal waste water, where necessary in a step-by-step approach (Article 3, *1e*). Parties should take appropriate measures such as application of best available technology, in order to reduce nutrient input from industrial and municipal sources (Article 3, *1f*).

Parties should take appropriate measures, such as the application of the best available technology, in order to reduce nutrient inputs and hazardous substances from diffuse sources, especially where the main source are from agriculture (Article 3, *1g*). Parties should apply environmental impact assessment and other means of assessment (Article 3, 1h). Sustainable water-resource management, including the application of the ecosystem approach should be promoted (Article 3, *1i*). Finally parties should develop contingency planning (Article 3, 1j).

The global practice

Article 9(2) stipulates the tasks of these joint bodies as follows: To collect, compile and evaluate data in order to identify pollution sources likely to cause transboundary impact (article 9, 2a); to elaborate joint monitoring programmes concerning the quality of water and quantity (Article 9, 2b); to draw up inventories and exchanges information on pollution sources (Article 9, 2c); to elaborate emission limits for waste water and evaluate the effectiveness of control programmes (article 9, 2d); to elaborate joint water quality objectives and criteria having regard to the provisions of article 3, paragraph 3 of this convention and propose relevant measures for maintaining and, improving the existing water quality (Article 9, 2e); to develop concerted action programmes for the reduction of pollution loads from both point sources (Municipal and industrial sources) and diffuse sources (particularly from Agriculture) (Article 9, 2f); to establish warning and alarm procedures Article 9, 2g); to serve as a forum for exchange of information on existing and planned uses of water and related installations that are likely to cause transboundary impact (article 9, 2h); and to promote cooperation and exchange of information on the best available technology in accordance with the provisions of article 13 of the Convention (Exchange of information between riparian parties), as well as encourage cooperation in scientific research programmes (article 9, 2i)

and lastly, to participate in the implementation of environmental impact assessment relating to transboundary waters, in accordance with appropriate international regulations (Article 9, 2j). This convention reflects major substantive characteristics of international organizations and other development partner in the creation of the basin regime. Important aspect considered by this analysis is the integration of these characteristics into the basins environmental regime and how they influenced the attainment of the regime target.

However, a global application of the convention was expressed in the 1997 Convention on the Law of the Non-navigable Use of International Watercourses provided that states shall utilize their respective territories of international watercourses in an 'equitable and reasonable manner' consistent with adequate protection of the watercourse (Article 5). Article 7 provides that states shall take all appropriate measures to prevent the causing of significant harm to other riparian states and where such harm was caused states would consult one another in order to eliminate or mitigate such harm. Again Articles 9 and 11 provide for exchange of data and information, including consultations on effects on planned measures. This considers the principle of Prior notification of planned developments by member states. Article 20 stipulates states shall protect and preserve the ecosystems of international watercourses, and shall act to prevent, reduce and control pollution of an international watercourse while Article 22 provides that states shall take all necessary measures to prevent the introduction of species, alien or new into an international watercourse which may have effects detrimental to the ecosystem of the watercourse.

Discussion

This analysis identifies the main substantive characteristic, norm, of the regime as *joint management. The goal of creating a programme for tripartite environmental management was to merge efforts to manage the Lake Victoria as a shared environment. It is out of this understanding that* the partner States recognized regional cooperation as an essential component for the environmental management of the Lake Victoria, established the Lake Victoria Environmental Programme (LVEMP) and the Lake Victoria Fisheries Organization to jointly manage the fisheries resources of the lake.

Joint management is founded on the principle of integrated management, *maintaining the environmental value of the lake for sustainable development*, *maximizing the benefits by maintaining sustainable yield for food and socio-economic security reducing detrimental development and use effects on ecological system,* and *understanding consequences of poverty and poverty alleviation for environmental management of the lake and its resources.* It is also worth noting that this analysis identifies a significant substantive characteristic, 'sustained long-term effort'. Its interpretation as a norm, principle and rule is very crucial for the regime to have significant impact (see Chapter 6).

The regime rules could be summarized under the precautionary approach that include the obligation to notify other member states, information exchange; and the sustained long term effort measures. General rules of procedure may become rules of customary international law in which majority states have been participating in a consistent manner. However, Farrajota (2002: 303) warns that the assessment of procedural rules in large number of treaties in the process of international regime formation requires considerable caution due to the following reasons.

First, the application of customary rules is only with regard to some regions (Berber 1959:114). Second, this application of this law has conventional character that contradicts the existence of rules of customary international law (Bruhacs, 1993:72). Thirdly, many treaties exhibit a particular normative pattern that demonstrates states belief in a particular principle or rule indicates what the whole community of states consider good practice in similar situations (Farrajota 2002:303). To assert the existence of this rule as legal duty, states have to honour the existence of its obligation. This is attained by states entering into bilateral or multilateral agreements/treaties.

Although many states have entered into cooperation and set forth some agreements and treaties in transboundary water basins, this state compliance could be attributed to the conditionality by financing policy (Farrajota 2002:304). Also, states do not notify each other of the basin developments as a legal obligation, but rather do so for the sake of good neighbourliness, or because they consider it opportune at times.

An important rule for the basin is the precautionary approach rule. It establishes the due diligence to exercise the duty of care. Among such precautionary approach measures is prior notification. The basin states agreed to employ environmental impact assessment (EIA) as tool for prior notification in the basin. However, due to lack of regional standards most of the EIAs done have not been useful in addressing the environmental problem in the basin.

Prior notification has been considered by several authors as a rule of the general customary international law (Tanzi and Arcari 2001:204-210) and therefore, applies to all states irrespective of whether they are members to a treaty or not (Mendelson 1998:228). However,

this is not adhered to in the basin. For example, the allocation of Mau Forest Reserve- Kenya, a prime tropical rainforest and a major catchment area of the Lake Victoria, to landless communities, was done without any prior notification to the basin member states.

On the other hand, Recuerda (2008) argued that the international law conceptualization of precautionary principle and its approach is diffuse if not controversial. While the term principle refers to fact of causation or rectitude, its connotation in general law is applied as a principle of law which refers to a source of law. As such, the useage of precautionary principle is not linked to precautionary measures. This general useage of precautionary principle is common. From the above analysis, the useage of precautionary principle in the Lake Victoria Basin is understood as a source of law rather than a fact of causation and rectitude.

The main procedural characteristic of the regime form the foregine analysis is the *precautionary approach*. It was founded on the *principles of equitable and reasonable use, prior notification and information exchange, harmonization of regulations, and the building of national capacity, establishing sustainable long-term effort, and establishing common but differentiated responsibility.*

According to Higgins (1993:136) procedural obligations, also named as procedural law of co-operation, play a critical role in the implementation of substantive principles and in the protection of the environment of international water resources (*Ibid*). Their aim is to ensure participation of all interested states in the decision-making process (Okowa, 1997:277). They include obligation to notify planned measures and environmental impact assessments, provision of emergency information, obligation to enter into consultations and negotiate in

good faith concerning planned measures, and obligation to exchange data and information. Their major aim is to ensure participation of all concerned states in the decision-making process for joint management (see Okowa, 1997:277).

Again, what we call 'precautionary approach' here, i.e. the basis of transboundary environmental management, was not conceived as such in the Lake Victoria basin (see Recuerda 2008). A precautionary approach is a particular 'lens' used to identify risk that every partner possesses; and is in most cases, binding (*Ibid*). This 'lens' can only exist if due care was established by the regime. Table 5.1 is a summary of the regime characteristics in the basin.

Table 5.1 Summary of the main regime Characteristics

Norm (standard behaviour)	**Principle (fact causation or rectitude)**	**Rules**	**Procedural Principles**	**Procedure**	**Practice**	**Organization**
Joint management	Equitable and reasonable use	Integrated management	Common but differentiated responsibility	Staggered Programme approach	To Identify and to demonstrate self-sustaining remedies	Regional Environmental Management Progamme (LVEMP)
Regional cooperation	Precautionary principle	Precautionary approach	Prior notification and information exchange	Phase 1 -5 years program	Desire to address specific environmental threats	Regional Secretariat that later became LVBC
Maintaining environmental value	Principle of intergenerational equity	Information exchange	Precautionary principle	Phase II-started in 2008	14 pilot zones	National secretariats
Maximize benefits	Sustained long-term effort	Access to information	Benefit maximization		Capacity Building	Main regional policy steering committee
Reducing detrimental effects	Principle of integrated management	Public participation, prior notification	Precautionary Approach		Assess lake-wide activities for environmental threats	Two regional task forces
Poverty eradication	Equitable and reasonable use	Prior notification	Equity		Support regional and national programme activities	Projects Coordination

Generally, the treaty approach to tackling problem in transboundary environments calls for the exercise of diligent control of sources of harm (Shaw 2008: 855-6). The test of due diligence in fact is accepted as the most appropriate standard. It involves elements of flexibility. As such, states take necessary steps to prevent environmental degradation and to demonstrate behaviour expected to be 'good government' (*Ibid*).

The member states were to establish performance goals within an agreed set of standards i.e. due diligence. Such behaviour would require establishment of a system of consultation and notification to avoid harm to another party. The States therefore co-operate in good faith in trying to prevent such activities from causing significant transboundary environmental degradation by spelling out *due care* i.e. the duty for care. The regime in the basin established a programme to fulfil the duty of care that had not been established by the three member states i.e. tried to fulfil due diligence without establishing due care.

Principle 24 of the 1972 Stockholm Declaration provides that matters of international on improvement and protection of the environment should be handled in a co-operative spirit. On the same note, Principle 7 of the 1992 Rio Declaration provides that 'states shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem i.e. spirit of due care.

Again tasking both national and international activities, Principle 13 of the Rio Declaration stated that 'states shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities with the jurisdiction or control to areas beyond their jurisdiction'.

To attain this states have to establish an 'equitable balance of interests': the degree of risk of significant transboundary environmental degradation and the availability of the means of preventing the environmental harm or repairing the harm; and the importance of the activity, taking into consideration the overall advantages of social, economic and technical character in relation to potential harm.

In this analysis of environmental regime architecture in the Lake Victoria Basin, the programme was seen as an end in addressing the basin environmental problem rather than a means to problem solving. The primary norm 'water is life and essential for sustainable development is a global norm also identified by the basin regime outputs. In transboundary water resources, like the Lake Victoria, this norm has sub-norms that include joint management. Other norms as already identified can be summarized as, regional cooperation is essential for transboundary environmental management; maintaining the environmental value of the lake for sustainable development; maximize the benefits by maintaining sustainable yield for food and socio-economic development security; reducing detrimental development and use effects on ecological system of the lake by recognize the value in wetlands and realization of significant changes; and understanding consequences of poverty

and poverty alleviation for environmental management of the lake and its resources (see Table 5.1).

Principle 2, the 1992 Rio Declaration observed that, the natural resources of the earth, including the air, water, land flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning and management, as appropriate. It also indicated that states have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction (Principle 21). Also states shall cooperate to develop further the international law regarding liability and compensation for victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such states to areas beyond their jurisdiction (principle 23).

Principle 24 states procedural element to international matters, it states “the protection and improvement of the environment should be handled in a cooperative spirit by all countries, big and small, on equal footing. Cooperation through multilateral or bilateral arrangement or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres; in such a way that due account is taken of the sovereignty and interests of all states”. It also gives full mandate to international organizations, to ensure efficient and dynamic role for the protection of the environment (Article 26).

All the principles identified here are basically derivatives of the duty for care, broadly classified under the precautionary principle. Those set out in the regime instruments follow a critical course of action among partner states. However, their practical ramifications seem lacking and somehow conflicting with the joint and efficient management. Although the precautionary principle calls for equal standards to be used by all the partner states regardless of scientific evidence, basin states did not provide the mechanism of monitoring equal implementation of standards to attain the desired goal of joint management.

For example, fisheries management in the basin is highly developed to the level of having the Lake Victoria fisheries convention. Its major contribution to addressing the problem of overfishing is the agreed standard of fishing net mesh size to be used in the Lake Victoria. The application of these standards by member states indicates general failure with serious use of under size fishing nets. Joel Otieno observed that, the use of under meshed fishing nets is in the increase especially in the Dunga beach. He asserted the authority or Kenya government and LVEMP fisheries officers are very much aware of the use of undersized fishing nets (Joel 2008). What this means is the core for precautionary principle is well established in policy and law documents, however, its implementation is lacking. It is not a binding principle due to lack of regulatory action. Principle 15 of the Rio Declaration 1992 states that, in order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. As pointed out by Gracia (1995), “the wording, largely similar to that of a principle, is subtly different in that: (1) it recognizes that there may be differences in local capabilities to apply the approach, and (2) it calls for cost-effectiveness in applying the approach. This actually softens the approach.

Conclusion

This chapter has explored the substantive characteristics of the APTEMAP and related instruments by identifying the goals (norms), the general principles, the rights and obligations and the rules of the regime. It has stipulated the procedural characteristics by identifying the procedural principles, the procedures and the practices and the organization. It has also explored a global contextualization of the environmental regime in the basin, and given a summary of the regime architecture.

In sum, the foregoing analysis identifies the main regime output as APTEMAP and its related instruments i.e. the EA Treaty 1999 and the Lake Victoria Protocol 2003. In these outputs cooperation was identified as the major norm due to the fact that the Lake Victoria is a shared regional resource, and co-operation is therefore important.

The goal of the basin regime was to entrench joint management in the Lake Victoria Basin. The findings of this analysis suggest joint management does not mean co-operation, though, co-operation is a fundamental principle of joint management. To co-operate, member states agree to undertake agreed responsibility within their sovereignty, under the ‘doctrine of absolute territorial sovereignty’ i.e. every nation can utilize transboundary water as it likes without duty to consult (Correia and Silva 1999). While in joint management, member states operate under the ‘doctrine of absolute territorial integrity’ that employs the principle of equitable and reasonable utilization (Rahman 2005). This principle involves taking into account of equitable share of factors such as geography of the basin, hydrology of the basin, population dependent on the waters, economic and social needs, existing utilization of waters, potential needs in future, climatic and ecological factors to a natural character and availability

of other resources (Article V, Helsinki Rules 1966 and Article 6 UN Watercourses Convention 1996).

From the foregoing analysis it is evident the regime in the Lake Victoria basin is a co-operation and not a joint management. The partner states wrote joint environmental management proposals for funding, identified common programme components, but managed the basin as separate sovereign units. This is not, nevertheless, joint management as will be indicated by its impacts in Chapter 6. To attain joint management, the member states have to workout further procedural rules that entrench substantive characteristics.

This is chapter has illustrated how the basin states misunderstood how to interpret the 'duty of care' as a source of law for guiding due diligence approach (see discussion above). The findings suggest substantive characteristics were not internalized during the regime creation stage, especially in the socialization of actors in problem factors. As such, the framework for precautionary approach, missed the 'standards of behaviour' supposed to attain due care. The regime emphasis was in procedural characteristics through creation of an environmental programme, by implementing operational directives of donor agencies, than instilling the duty for care. This was not the same as setting a regime to care and address the environmental problems in the basin.

In conclusion, the member states concentrated in laying the foundation of due diligence i.e. setting up a programme, by putting emphasis on procedural concerns rather than substantive concerns. This led made the regime, and eventually, the Lake Victoria Environmental Programme (LVEMP), put less emphasis on measures to attain 'duty of care'. The impacts of this type of regime are explored in next chapter.

Chapter Six

CHAPTER 6

IMPACTS: The impacts of the Lake Victoria Basin regime

> ***"****I would rather discover one causal relation than being King of Persia.****"*** *Democritus (430-380 BC)*

Introduction

Chapters 4 and 5 addressed the creation and the architecture of the Lake Victoria Basin environmental regime respectively. However, the purpose of creating any regime is in the hope it will effectively solve its intended problem. This chapter is an analysis of the impacts or the problem solving capacity of the basin regime. As stated earlier, impact analysis means "determining the extent to which one set of human activities affects the state of objects or phenomenon" (Mohr 1995:1). It further means determining how the effects were as small or large as they turned out to be (*Ibid*).

Hence, analysis of transboundary water regime impact means determining the extent to which regime affected the intended problem. Such impacts analyses measure changes caused by the regime on the natural environment or changes on the social welfare of the people (Chapter 2 and 3). This impacts analysis determines the extent to which main regime substantive and procedural characteristics affected the people or the natural environment in the basin. These characteristics, as identified in Chapter 5, include: joint management (as the main substantive characteristic) and precautionary approach (as the main procedural characteristic). As stated in Chapter 3, observations, interviews and documentary evidence are used to established causations and eventually the impacts of joint management and precautionary approach to

overall problem solving. It applies a qualitative approach to impacts analysis that does not rely on evidence for counterfactuals to make causal inference (Chapter 3).

The remainder of this chapter unfolds as follows. Section 2 explores the impacts of the substantive measure on solving the problem of environmental degradation in the basin. Section 3 investigates the impacts of the regime precautionary approach to solving the environmental problem in the basin. Section 4 is a discussion of the regime impacts while Section 5 concludes the chapter. The following section is an impact analysis of joint management in the past eleven years of the regime from 1997 to 2008.

The impacts of the substantive characteristics of the regime

This section explores the impacts of substantive characteristics of the Lake Victoria regime. As stated earlier, substantive characteristics defined as those "that establish substance or material, rights and obligations upon each other. As established in the APTEMAP 1994, the EA Treaty 1999, and the LV Protocol 2003, is basically founded on the rights and obligations to jointly manage the environment of the Lake Victoria and its basin resources for the socio-economic welfare of the basin communities, member states and the wider global community.

The approach to this impact analysis is based on the method of subobjectives and *modus operandi* method (Chapter 3). Through the method of subobjectives, the norm of joint management is decomposed, judged and synthesize for impacts. The modus operandi method through its physical causal reasoning approach evaluate how the generic elements of joint management addressed holistic and integrated environmental management criteria. The dimensions of integrated environmental management, namely: comprehensiveness, interconnectivity, the strategy, and interactive coordination of environmental management

activities in the basin (see Chapter 3). This is based on the understanding that integrated environmental management is a "planning and management approach to better achieve one or more ends, including ecologically sustainable management; proactive and anticipatory environmental decision-making and management; more effective and equitable balancing of the interests of environmental resource users and other affected parties; and social and economic change (Born and Sonzogni 1995:169). In this thesis, as stated earlier, this is considered the essence of an effective transboundary water regime. The following subsections explore the impacts of overall activities of joint management under the four dimensions of holistic or integrated environmental management.

Joint management

Comprehensiveness

Comprehensiveness as stated earlier, is the act of including much or all (Mitchell 1986; Downs and others 1991). It is used here to evaluate how joint management interventions in the basin, embraced all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management (Mason and Mitroff 1981; Odum 1989; Ostrom 1986; Mitchell 1987).

First, the Staff Appraisal Report (SAR 2005) describes LVEMP, the main product of the regime, as "a 'comprehensive' programme conducted by the three countries Kenya, Uganda and Tanzania. Its major aim is to rehabilitate the Lake Victoria ecosystem for the benefit of the 35 Million people who live in the catchment, their national economies and the global community. However, studies up to now claim environmental degradation as a threat to the future of the basin (Chapter 4). The programme (LEMP) was envisioned as the best possible

approach for remediation of the undesirable changes that have reduced beneficial uses of Lake Victoria biological and water resources (Kolding *et al.* 2005).

This analysis for impact of the regime considers the following subobjectives. The ability to cooperate, the ability to identify substantive elements, the ability to create a basin regime, the creation of regional environmental programme, the ability to attract funding, setting of regional secretariats, and institutionalization of the regime under LVBC.

The cooperation for environmental management in the basin was, as articulated in Chapter 4, influenced the basin to sign a framework agreement, APTEMAP. The basin riparian states, Kenya, Uganda and Tanzania, came together and created the regime to address the environmental degradation problem in the basin. It became clear to the member states, that individual efforts were not enough to tackle the environmental problems facing the basin (Preamble, APTEMAP). This is the first impact of joint management.

There are many explanations that can be attributed to the success for cooperation. First, as stated in Chapter 4, is the 1992 Rio Conference. Second, the region was already restructuring the East Africa Community. Third, it was the desire of donor community and development partners, including UNEP to have the basin united (Chapter 4).

Secondly, through the regime, the basin states qualified to fulfil some operational directives of funding and donor agencies, the World Bank and GEF, which attracted funding (Chapter 4). Thirdly, it was the funding from the donor agencies that facilitated the implementation of the regime (*Ibid*). Through donor funding and loaning from multilateral financial agencies secretariat were set, and programme components were piloted under Phase 1 of the regime

implementation. Fourth, through the donor funding studies and projects were undertaken across the three basin states (see Chapters 4 and 5). We can therefore trace these activities from the norm of joint management to address environmental problem of the basin.

The cooperation to jointly address environmental management in the Basin became an issue of concern during the creation of the East Africa Community. Through the EAC Development Strategy 2006-2010, the Lake Victoria Basin Commission (LVBC) was established under the 2003 LV Protocol in 2005. The mandate of LVBC includes providing a regional coordination framework for sustainable development of the Lake Victoria Basin. It coordinates the efforts of partner states on the management of transboundary resources of the Lake basin (WB 2007).

All the basin environmental and socio-economic activities were placed under LVBC as the managing institution. All the activities of LVEMP I and the currently LVEMP II were placed under the commission. This new approach to joint management recognized some of the short comings observed in the creation of the basin environmental regime (see Chapter 4). As such, LVBC Operational Strategy 2007-2010 coordinated the identification of key environmental issues of the Lake Victoria Basin, through Transboundary Diagnostic Analysis (TDA) in all the five basin countries, namely: Kenya Uganda, Tanzania, Rwanda and Burundi. The results were coalesced into a Regional Transboundary Diagnostic Analysis (RTDA) report. The above efforts of joint management saw the current set-up of LVEMP II in 2008. However, some efforts were lacking in aspects of comprehensive approach to tackling the basin problem as shown here.

Based on the comprehensiveness criterion for holistic/integrated environmental management, the joint management approach has raised many challenges. First, linkages were not considered in the conceptualization and contextualization of the basin environmental problems and the vision for prosperous living under sustainably managed environment for providing equal opportunities and benefits, the new core norm. The shift from APTEMAP to EAC treaty's LV protocol was not based on what had been established under the Agreement. The substantive content established by the agreement was more environmental oriented while that established by the protocol was development oriented.

While the key principle of the protocol was 'equitable and reasonable utilization' of basin resources and environment for sustainable development, the vision and strategy of the EAC for the basin was 'equitable opportunities and benefits'. This guided the creation of the LVBC as a permanent apex institution charged by EAC to manage the basin affairs. This suggests the underestimation of the problem pressure, with more focus on exploitative and economic related targets that ecological sustainability.

Interconnectivity

The aspect of interconnectivity in integrated environmental management explores how the regime addresses "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states" (Born and Sonzogni 1995:170).

According to the Implementation Country Report (ICR) Uganda (2005), the programme is quite ambitious and therefore does not address these dimensions of interconnection

significantly well. Linkages and interrelationships were not established among the physical and biological process and among the various programme components (i.e. the failure of problem conceptualization identified in Chapter 4). As such, both spatial and temporal linkages were missing in the conceptualization of the regime. Spatially, the country government, the EAC and the Basin seem to be not well coordinated in running the basin activities. The link between the regional and country secretariats, and the LVBC regional secretariat seem to be not well established. The LVEMP personnel see LVBC as a different institution with much wider mandate than just environmental matters. As such, activities in the pilot zones remain not well coordinated and linked as one intervention. For example the catchment afforestation activities are not undertaken in a manner readily to realise reduction in sedimentation to the rivers and the lake.

Another limitation in the interconnectivity aspect of joint management is the lack of contextualization of the basin environmental problem in the wider basin development context. While one of the objectives of the regime is to manage the basin to solve aspects of poverty, the joint management approach of the regime is yet to connect the human development activities to their environmental consequences in the basin.

The regime creation process under the Agreement was intended to structure the joint management and the programme strategy to address environmental aspects connecting all cross cutting issues of resource use conflicts and its subsequent degradation. However, the approach was not integrated, considered the basin as a unit, as the three nationals' elite developed proposals on the basin environmental problems that were later merged to one regional proposal that founded the LVEMP (Chapter 4). Box 1 below gives some evidence of lack of interconnectivity in joint management.

Box 6.1 Evidence from interviews for causal reasoning on interconnectivity of joint management

"community participation was low"

"the operative framework of World Bank (WB) is not interconnective, it picks a team leader from one of its officers. If the team leader is not interested, or not an expert in an areas, some issues will not be addressed. For example, the group developed a regional water management model with one of the WB leaders, when he was changed, the leader who replaced him/her did not put the model into consideration".

"Kenya had leadership wrangles; the executive officer did not identify himself with the project and its aims. The executive secretary was a political appointee and financing had a lot of government interference."

"there was lack of clear understanding of the programme objectives and concepts"

"there is a lot of fragmented research going on in all the three countries, Kenya, Uganda and Tanzania. Right from 1970, Makerere University has engaged in good research on the Lake Victoria. A lot of data is already there, especially on pollution. LVEMP just updated the data, which remains scattered with individuals, institutions and research organizations".

The strategy

The strategy adopted can be examined from a review of the design of joint management activities. Strategic approach to integrated environmental management is "the filtering process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena" (Born and Sonzogni 1995:171). It provides the means for bounding the inevitable complexities of joint management and fosters action orientation and remedies many of the problems that hinder implementation of joint management (*Ibid*).

The design *for joint environmental management was* noted to be complex and ambitious (ICR, Uganda 2005). LVEMP was prepared over a two-year period from 1994 to 1996, and implementation from July 1997 to December 2005. Its specific objectives were addressed in the form of LVEMP project, the Phase 1 of the programme. Basically, phase 1 was to provide the necessary information needed to improve the management of the lake ecosystem,

establish mechanisms for cooperative management by the three countries, identify and demonstrate practical self sustaining remedies, while simultaneously building capacity for ecosystem management (LVEMP Uganda 2005). The original design had five components divided into 12 sub-components and 26 activities (*Ibid*). During re-alignment and re-focusing, the number of components increased to ten and sub-components increased to thirty (*Ibid*).

Coordination

Lastly, the coordination of joint management was through setting up of secretariats and "harmonization of national programmes in the lake region". As indicated in Ch.4, a regional LVEMP secretariat was set at Tanzania to steer the policy and programme coordination activities while national secretariats were set in Kisumu, Kenya and Entebbe, in Uganda. The Kenyan secretariat was responsible for water quality and land use, including wetlands while the Ugandan secretariat was responsible for fisheries management and control of water hyacinth and other invasive weeds. However, the regional secretariats approach did not work well as Kenya was lagging behind in implementation (Mugodo 2008, the National Coordinator LVEMP II, Tanzania). In Tanzania, the disbursement of funds was on the discretion of the regional coordinator, who on acting as the National Coordinator dominated the programme activities in the country (*Ibid*). Bwathondi (2008) observed that, the transfer of LVEMP to EAC created a problem, especially for Tanzania (See text box below). Also in Tanzania, the regional secretariat became the national secretariat, out of the decision of the regional Executive secretary (Mugodo 2008).

Phase I of the regime was to provide information for the preparation of Phase II of LVEMP. It also "fully operationalized the Lake Victoria Fisheries Organization (LVFO) which had

been in abeyance for three years since it was established in June 1994" (ICR, Uganda 2005). According to the Implementation Completion Report, Uganda (2005), the opreationalization of LVFO enhanced the attainment of harmonization of fisheries legislation in the three countries that led to review of Fisheries Acts and enforcement of laws in pilot zones through co-management (ICR, 2005:VII).

Box 6.2 Evidence from interviews on causal reasoning on coordination of joint management

"the disbursement of funds was on the discretion of the regional coordinator, who on acting as the National Coordinator dominated the programme activities in the country"

"The transfer from the Agreement to the EAC Treaty had a problem. Especially in Tanzania LVEMP regional secretariat became the country LVEMP Secretariat at the discretion of the Regional Executive secretary who was a Tanzanian"

"the lack of full government commitment delayed and derailed the regime activities

"governments were to pay 10 per cent of the implementation budget; this was a lot of money for the member states to pay. This delayed disbursement of funds for regime implementation".

"coordination was also suppressed by political suspicion which led to lack of trust among leaders of member states"

Balirwa (2008) observed that, the lack of full government commitment delayed and derailed the regime activities. This made country management not very efficient. The governments were to pay 10 per cent of the implementation budget; this was a lot of money for the member states to pay. This delayed disbursement of funds for regime implementation.

Tanzania was not able to raise its 10 per cent of the budget and requested 100 per cent funding from the WB (Balirwa 2008). Kenya was able to raise its amount however there were delays in the release of funds which delayed regime implementation in its section of the basin

(*Ibid*). Coordination was also suppressed by political suspicion which led to lack of trust among leaders of member states (Ogutu-Ohwayo 2008).

Causal importance of joint management

Causal importance refers to how the joint management approach addressed the basin environmental problems. This involves assessments of causal distance both logically and semantically with respect to such a goal (Steinberg 2008: 190). The assessment of causal importance of joint management in the Lake Victoria Basin is based on the earlier stated four dimensions of integrated environmental management. The results suggest joint management approach contributed to observable impacts in the basin.

First, identification of regional norm: to jointly manage the Lake Victoria Basin and its environment (Chapter 5) was significant initiative towards addressing the basin environmental problems. Through joint management, the regime stated general normative principles, which formed the focus of Basin management approach by the three partner states. The states recognized the transboundary nature of the Lake Victoria environment, as it extends territorial sovereignty. The basin therefore had to be managed as a unit (EA Treaty, article 114 (2b)iv). The member states were also cautiously aware of the environmental importance of Lake Victoria and its significance to sustainable development (see Chapter 5). These reasons built the impetus among the three member states to manage the basin together. The states therefore recognized regional co-operation was essential for the management of Lake Victoria Basin.

Second, joint management was crucial for cooperation of the three riparian states and for the creation of regional environmental programme (LVEMP). Although member states had a long history of cooperation, first regional cooperation for environmental management was in the Lake Victoria Basin (see Chapter 4). The three riparian states had no choice but to cooperate, especially when had water hyacinth weed spread all over the lake. The spreading weed affected waterways, choked water intakes for domestic water supplies, interfered with hydroelectric power generation, and fisheries. This physical causation made the three member states to seek common solution to the problem. The heads of governments signed APTEMAP to create a tripartite environmental management programme, LVEMP. This was a significant step towards jointly addressing the environmental problems that affected the lake and the basin as a whole.

Third, joint management brought together scientists, politicians and other stakeholders in the basin to further understand the environmental problem of the basin. This led to writing of joint proposal for the tripartite environmental management programme which attracted funding from GEF and WB in 1996 (LVEMP GOU 2005). How effective these interventions were in solving the problem of environmental degradation in the basin is explored in Ch.7.

The regime was found to be not up to the desirable levels in terms of its comprehensiveness. The following aspects of the examined joint management sub-objectives were found to be not comprehensive, namely: identification of substantive elements, the attraction of funds, and its impetus to the setting up of Lake Victoria Basin Commission (LVBC). The identification of environmental management norms was basically through a ‘band-wagon’ process as it was guided by existing international environmental conventions and operational directives of multilateral funding agencies (Chapter 4). Guided by the just concluded Rio convention and

its declaration the basin states' elites were able to put together norms, principles and rules, as indicated in the LV protocol of 2003.

The attraction of funding was comprehensive. This was basically dictated by the funding agents' operation directives. The basin states had no choice but to follow all the required procedure to secure funds, which, they needed most. As such, they quickly developed national proposals, which were later merged to form regional environmental management proposal for the Lake Victoria Basin. The setting up of a basin commission was a noble idea to house the resultant programme. The set-up process and running of the Lake Victoria Basin Commission constitutes a significant aspect to the future success of the regime. After exploring joint management causal importance under the four dimension of integrated environmental management, the following section is an outcome line of the joint management.

Joint management created a shared understanding of the whole basin. The three partner states recognized that, "water is a finite and vulnerable resource essential to sustain life, development and environment and must be managed in an integrated and holistic manner". The Lake Victoria, a shared freshwater resource among the three states posed a challenge in attaining this norm. Hence, the regional heads of states agreed that regional cooperation was an essential component of the environmental management of the lake (paragraph 8, APTEMAP preamble) and created APTEMAP and related instruments to jointly manage the basin environment.

From the foregoing analysis the results suggests, various aspects of comprehensiveness, interconnectiveness, strategy and coordination were heavily compromised in all the subobjectives of joint management (see Box 6.3). The cooperation aspect of joint management was not comprehensive as some basin states were left out and joined later in phase 2 of the regime implementation (Rwanda and Burundi were not included in Phase 1). It was also not interconnective as proposals were merged without a holistic assessment conducted. As such, some stakeholders were not consulted in a collective action process. The process was neither comprehensive and interconnective, nor coordinative (see Table 6.1).

The identification of substantive characteristics as established in Chapter 5, and according to the above analysis, was compromised. It was not interconnected, strategic and coordinated to solve the problem of environmental degradation in the basin. Identification of norms, principles and rules combined with availability of funds are ideal for effective regime implementation.

Box 6.3 Examples of causal reasoning from interviews on the impacts of the joint management norm in the Lake Victoria Basin

"World Bank uses its prominent position to give loans. Loans are not the best they are given with attachments and conditionality. It mostly influences where the money is to be used. In their funding for water resources assessment, their interest was in infrastructural development. Most of their set infrastructure is now disintegrating"

"There was a lot of fragmented research in all the countries about the Lake Victoria Basin" right from 1970s. The countries stated at different levels in implementation of the regime. Uganda had a National environmental management Act by 1995, Kenya 1999 and Tanzania, a National Environmental Management Council by 2004 "

"The lack of awareness of the basin community led to the Regional Water Quality Laboratory at Kisumu Kenya to be burnt down during 2007-2008 post election violence clashes in Kenya"

"The Protocol for Sustainable development of the Lake Victoria Basin was mainly from LVEMP which established the LVBC. However, the transfer from the Agreement (APTEMAP) to the EAC Treaty had a problem. Especially in Tanzania LVEMP regional secretariat became the country LVEMP Secretariat at the discretion of the Regional Executive secretary who was a Tanzanian"

"There was initially lack of strong regional institution like LVBC where funding could be channelled "

"The secretariats approach did not work as Kenya was lagging behind. This was mainly to satisfy political interests"

"There was no protocol on exchange of data on water levels, especially on how much water Uganda is discharging for HEP generation at Jinja"

"The governments did not embed the activities of the regime into their working. LVEMP activities were kept separate. This divided national experts"

"Each country signed for individual loan from the World Bank, this affected implementation coordination"

"The Bank policies influenced positively and negatively. The Bank withheld money due to inconsistency in implementation in some countries. The Bank wanted implementation to be done together but some countries lagged behind"

"Political suspension of some countries made it worse as it led to lack of trust. The programme pulled people together but politics is pulling us apart. This affects successful implementation of the regime"

"We East Africa people were one, but the creation of independent states separated us"

Table 6.1 Summary of the importance of joint management interventions to solving environmental degradation in the Lake Victoria Basin

Joint Management Intervention	Dimensions of holistic/integrated environmental management			
	comprehensiveness	**interconnectiveness**	**strategy**	**coordinativeness**
	Definition and significance			
	embracing all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management	Addressing "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states"	the filtering process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena"	harmonization of activities to observe fundamental values and targets
Cooperation	×	×	✓	✓
Identification of substantive elements	×	×	×	×
Regime creation	×	×	✓	×
Creation of regional environmental programme	×	×	✓	×
Attraction of funding	×	×	✓	×
Setting of regional and national secretariats and task forces	×		✓	×
Setting up of LVBC	✓	✓	✓	✓

✓ - satisfactorily fulfilled

× - Not satisfactorily fulfilled

The setting up of LVBC was an important aspect of joint management (see Table 6.1). LVBC made the regime score high on its coordinative dimension of integrated environmental management. The commission created substantial interdependence among agencies and the various stakeholders for sustainable developed of the basin. Its comprehensiveness defines an arena for interaction, including other basin states such as Rwanda and Burundi. Interaction among these affected entities helps define the interrelationships of concern among basin member states for solving the environmental problem facing the basin. This is a "realistic proxy for moving towards the ideal if integration in environmental management" (Born and

Sonzogni 1995:171). This analysis also found the regime to be strategic in all its sub-objectives.

The impacts of the procedural characteristics

This section identifies and explains the impacts of the procedural characteristics. It explores strategic dimension on how LVEMP identified and focused on key aspects of the basin environmental problem, selectively targeted the critical issues and tasks essential to success. The precautionary approach/measures attributions, refers to that which is to be credited for the observed changes or results achieved by implementing the regime. It represents the extent to which observed effects can be attributed to a specific programme intervention or to the performance of one or more partners, taking account of other interventions (anticipated or unanticipated) confounding factors, or external shocks (Sabrine and Holland 2009).

The Lake Victoria Environmental Management Project

The project was designed to successfully introduce environmentally and socially sustainable economic development to the basin. 'Its purpose over the long term is to enhance growth and reduce poverty while maintaining the rich biodiversity and resource base for the present and future generations'. The main objectives are as stated in Chapter 4.

The phase I of the project was implemented between 1997 -2002. Its focus was to: manage and control water hyacinth infestation and other aquatic weeds, improve fisheries management, research on fisheries ecology, biology and farming systems, manage water quality and quantity, and manage industrial and municipal effluents. Focus was also on soil

and water conservation, conservation of forests and wetlands, improve standards of living of local communities, and improve community participation in project implementation.

This section evaluates the impacts of the project components, namely: fisheries research and management; water hyacinth control; land use and wetland management; water quality management that included three subcomponents, namely management of industrial and municipal waste, management of eutrophication, and management of pollution loading; catchment management; soil and water conservation; capacity building; micro-finance; community participation and coordinating of secretariats. These components were individually implemented in different institutions and within the existing institutional structures to address issues and problems essentially the mandate of those institutions. These components were implemented by implementing agencies within the jurisdiction of line ministries and autonomous research institutions in the three countries. The following section identifies these components and their objectives.

Fisheries management

This was the single largest component of the regime programme. The aim was to establish sustainable fisheries management through stakeholder involvement. Its emphasis were on extension services, law enforcement, data collection, fish quality control, post harvest improvement and the establishment of fish trust levy to ensure sustainability

It comprised of seven sub-components with diverse range of activities evolved around fisheries resources management. The objective was to promote better management of fisheries on the lake by, amongst others, improving fishing technology and skills, and enhancing community participation in fisheries management, and enforcing fisheries laws

(Source: LVEMP 2005, Country Implementation Completion Report, Entebbe, Uganda). However, following a Mid-Term Report (MTR) 1999, changes were made to the original subcomponents: support for closed fishing areas and strengthening of law enforcement and other legal related aspects were merged under co-management subcomponent; the incorporation of local communities participation in fisheries management became a full sub-component, mainly for the establishment of Beach Management Units (BMUs); the plan to establish a fish quality laboratory and to study ways to reduce post-harvest losses of fish through handling and processing was upgraded to fish quality assurance component. This was mainly to respond to the challenge of the EU fish ban. Fisheries statistics and support to micro-projects were more re-focused.

There was some focus on fisheries extension activities where new fishing techniques were introduced: lift netting and live bait fishing, promotion of small scale aquaculture, and organization of fisher folk to participate in fisheries management. LVEMP provided funds for small-scale aquaculture to improve quality and availability of fish fry (see Figures 6.4, and 6.5). Before the inception of LVEMP, the 1970s and 1980s experienced minimal activities in aquaculture with just a few fish ponds dispersed in the region. With the support of LVEMP, the number of fingerlings in the region rose from 1999 to 2004 (Fisheries Synthesis Report 2005).

The fisheries management interventions had the following outputs: completed harmonization of fisheries legislation, identified and established closed fishing areas, established 325 Beach Management units, established 3 fish Quality Assurance Laboratories, reduced post-harvest fish losses to 8 per cent, some 215 community based micro-projects were established. Attained three complete Fisheries Frame Surveys 2000/2002/2004, completed fish trust levy

study (Orach-Meza *et al.* 2005). The general legal output of the fisheries management is indicated in Figure 6.6. It indicates the number of illegal gear arrested and offenders apprehended however, these outputs are too descriptive to aid impact analysis.

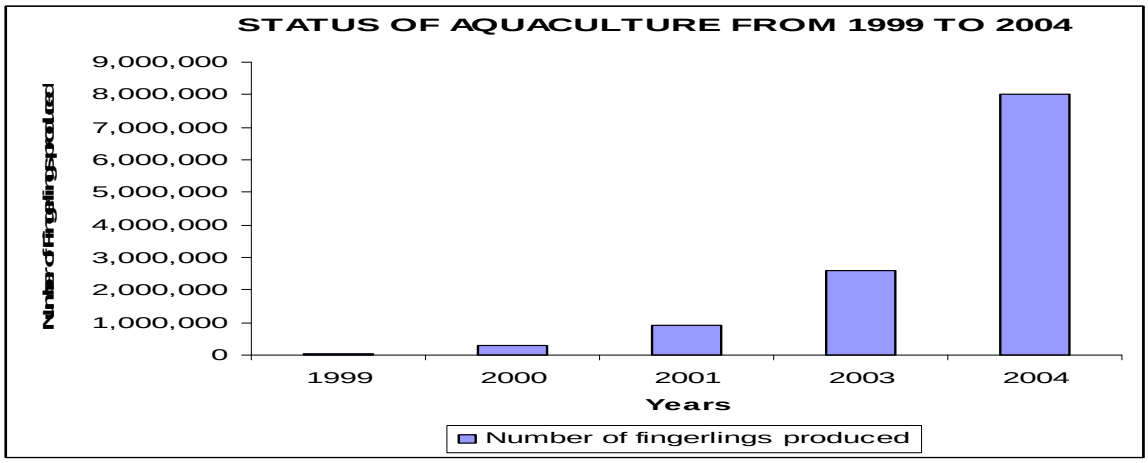


Figure 6.4 Status of aquaculture with inception of LVEMP: Source: Okedi *et.* al 2008

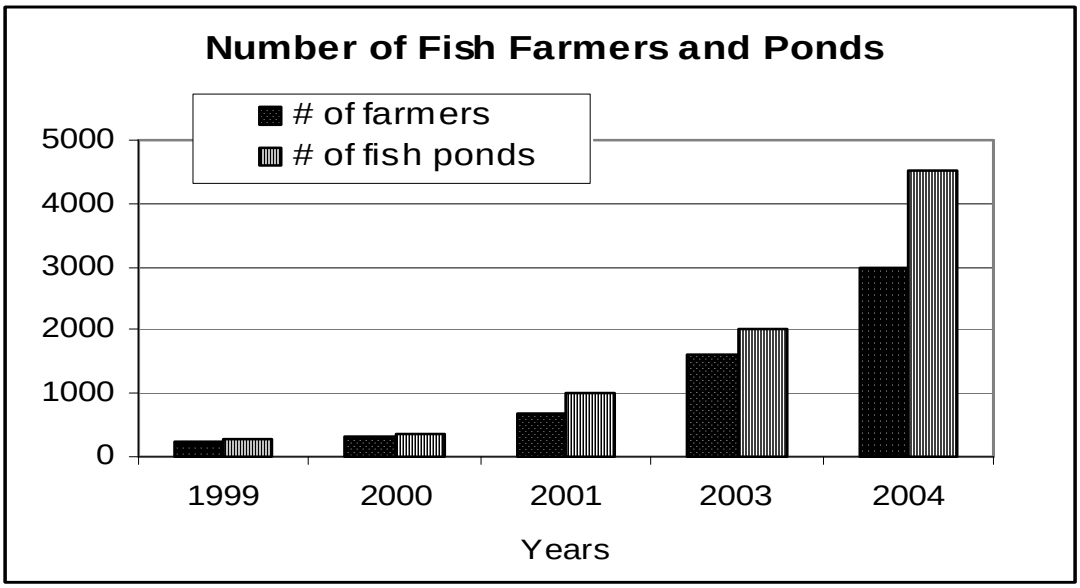


Figure 6.5 Number of fish farmers and ponds attained through LVEMP. Source Okedi *et.* al 2008

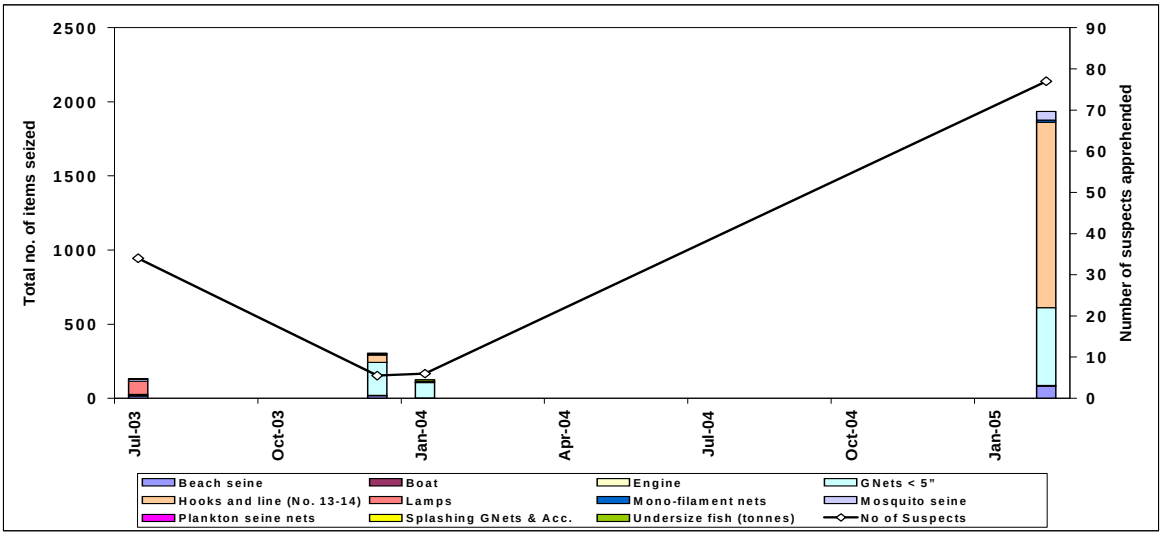


Figure 6.6 Prosecutions and impoundments in illegal fisheries activities: Source Okedi *et al.* 2008

Table 6.2 Precautionary approach for fisheries management			
Comprehensiveness	Interconnectiveness	Strategy	Coordination
Definition and significance			
embraces all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management	Addresses "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states"	the filtering process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena"	harmonization of activities to observe fundamental values and targets
Impacts in the basin			
11 areas of fisheries management have been identified for harmonization, 100 landing sites gazetted, 558 beach management units (BMU) been established, 75 fisheries personnel trained, and patrol boats bought, community training done, Gillnets standard mesh size set (5').	Conflicts even among states and fishermen common, e.g. Kenya and Uganda over a fishing Island- Migingo Island. Lack of enforcement and low fines for offenders. There is still a lot of illegal fishing	Strengthened extension, fish quality assurance, harmonization of fisheries legislation, Enforcement of fisheries laws, the fish levy trust, capacity building	Constraints in implementation (fund wise), lack of clear selection criteria, lack of activities prioritization, lack of clarity in objectives and concepts, lack of clear long-term vision, lack of adequate sensitization of community members

Source: LVEMP GOU 2003; 2005.

Fisheries research

The fisheries research component of the regime was to provide information on the ecology of the lake and its catchment, the biology of its flora and fauna, the impact of the environmental factors on the ecosystem, and the socio-economic implications of the use of the lake resources. It was to restore several endangered and threatened species of fish through aquaculture fish farming and increase fish production through appropriate aquaculture technology and practices.

The research done under the regime included extensive biotic field surveys and sample collections; taxonomic assessments of sampled fish; genetic characterization of some fish species; examination of the condition and effects of changing water quality; publication of research results in books and journals; introduced four species into fish farming, defined the potential for aquaculture in the lake basin, assessed the contribution of fisheries to national economies and developed a common database (SAMAKI) (Orach-Meza *et al.* 2005).

Table 6.3 Precautionary approach for fisheries research			
Comprehensiveness	Interconnectiveness	Strategy	Coordination
Definition and significance			
embraces all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management	Addresses "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states"	the filtering process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena"	harmonization of activities to observe fundamental values and targets
Impacts in the basin			
Three research boats, breeding ponds, museums and laboratories renovated in the three countries. However it has to be linked to the other components to be comprehensive. It currently operates like a unit of special people. More training also requires.	These have not yet been established as data is till so much lake based, especially on specific species. It should link to habitat changes. Its yet to be linked to management of the broader ecosystem	Research on Fisheries biology and diversity, socio-economic research, aquatic research, information and database, water hyacinth research, and fish stock assessment .	The three member states need to establish a data bank. Currently data is still with country fisheries institutes. Slow release of funds. Lack of research coordination to address basin problem.

Source: GOU LVEMP2003; 2005

Water Hyacinth Control

The focus of this component was on control of the weed by reducing it to manageable levels using biological and mechanical control. The state of water hyacinth invasion in Lake Victoria indicates that water hyacinth was extensively detected in the lake in 1987, entering through Kagera River (Twongo and Okurut 2008).

There were two key zones of water hyacinth proliferarion: the upper flood plain and the lower Kagera course. Proliferation occurs along river banks, pools and small lakes; sheltered bays and inlets. Proliferation takes place throughout the year but more intense in the dry season. Lateral and lake wide expansion of the weed continued upto 1995 when the average

was 10-15m in width on the Ugandan side. Explosive proliferation was witnessed in Kenya around Kisumu, Kendu, Nyakach, and Homa Bay. In Tanzania high proliferation were identified in Mara Bay, Bauman Gulf, Speke Gulf, Emin Pasha Gulf, and Rubafu Bay. Peak abundance was reached in 1998; about 12,000 ha of weed (*Ibid*), which led to an unprecedented collapse when massive mats sunk to the bottomof the lake (Kolding *et al.* 2005:37).

The devastating impacts of water hyacinth include disruption of power generation, obstruction of water transport, fishing, fish transportation, and marketing; blocking of access routes and landing beaches (Twong and Okurut 2008). The associated environmental impacts include degradation of water quality, impaired biodiversity, and outbreak of diseases (*Ibid*). The objective of water hyacinth control was to establish long-term capacity for the control of water hyacinth and other invasive weeds; specifically reduce abundance of water hyacinth on Lake Victoria to levels that does not exert negative socio-economic or environmental impact.

The process of water hyacinth control was first initiated in Uganda, followed by Kenya, then Tanzania acting independently initially (Twong and Okurut 2008). Regional approach to the weed control was l formulated in 1998 with support from LVEMP (*Ibid*). It emphasized application of biological control as the main approach. However, physical removal (through manual and mechanized means provided relief at key locations and installations such as the Owen Falls Dam's Nalubale Hydroelectric power plant.

Other control approaches were tried especially along the Ugandan side of the lake. Chemical control was attempted, however EIA carried out by Uganda led to shelving of practises after a public hearing. A natural control process has emerged, the ecological succession by native

plants on water hyacinth led to displacement of the weed by native plants such as Hippo-grass, ferns among other plants.

Figure 6.7 Photograph of Water Hyacinth, *Eichornia crassipes.* Source: Ho Yah Wen 2004

Physical control through manual removal comprised the use of hand implements and protective wear. Mechanical control, mainly done in Kenya and Uganda was done using harvesters, loaders and trucks. The biological control was attained through weevil *Neochetina spp*. Weevil multiplication facilities were set up in strategic locations around the lake for ease supplies of the weevil. Biological control was rated the most effective measure on the Lake Victoria as from 1998 to 2002. However, some resurgence of the weed is becoming a threat to effective control (*Ibid*). This could be due to inability to control water hyacinth in riverine environment and reverse ecological disturbance of the wider natural large lake environment.

In conclusion the water hyacinth control under the regime had the following outputs: reduced the water hyacinth weed by 85 per cent with manual, mechanical and biological control methods; completed research into the causes of water hyacinth proliferation, its resurgence and effects if sinking dead weed, established surveillance system and hot spots areas, and

established 72 weevil rearing centres and trained local communities to manage them (Orach-Meza *et al.* 2005).

A number of factors can be attributed to the rapid collapse of the weed on the lake. Management interventions by LVEMP and stakeholder could be attributed to. Interventions such as biological control by introduced weevil *Neochetina spp*., mechanical control measures, succession by other aquatic weeds such as hippo-grass, *Vossia cuspidate* and *Najjas horrida*) (Kolding et al., 2005; Otieno 2008) and chemical control all contributed to the rapid collapse.

Kolding and colleagues also attribute to the Eli Nino rains and related strong winds on the lake contributed to control efforts in that the weeds were crashed and weakened (*Ibid*). While biological control of water hyacinth in some sub-tropical regions by Neochetina spp., were found less effective in some sub-tropical regions (Hill and Olcker, 2000), biological control measures were the only effective measures in place in the Lake Victoria (Wilson *et al.* 2007:91). The larvae of *Neochetina* tunnel the petiole and the root-stock of the weed, thereby allowing bacteria and fungal infection that causes severe damage to the weed (*Ibid*).

Also direct destruction of aerenchymous tissue (enables the weed to float) and the flooding of old larval tunnels reduces the plant buoyancy and eventually submerges. A characteristic of control by the *Neochetina* weevil is that water hyacinth mats become water logged and sit lower in the water and as plant tissue destruction increases the mats sink to the bottom of the water-body (*Ibid*). However, the weevil populations although readily present around the lake are likely unstable and this suggests that it may lead to a resurgence in water hyacinth

populations with the lake (Williams *et al.* 2005). However according to Wilson *et al.* (2007) this is unsubstantiated (Wlison *et al.* 2007:92).

According to Bwathondi (2008), the water hyacinth problem is not tackled yet as it is not controlled at the source. The water hyacinth control succeeded because of the low weed flows from Kagera River. The source of the weed Rwanda was not included in the control of the weed in phase 1 of the regime. See evidence in text box 6.4.

Box 6.4 Evidence from interviews on causal importance of the water hyacinth control component

"Most of the weevils rearing stations were closing down. The beetles are disappearing and nobody is taking stock where the weevils are gone."

"The water hyacinth project succeeded because of low flows from Kagera River. The project should have been implemented in Rwanda and Burundi, the source of water hyacinth. You do not eradicate malaria without attacking the mosquitoes."

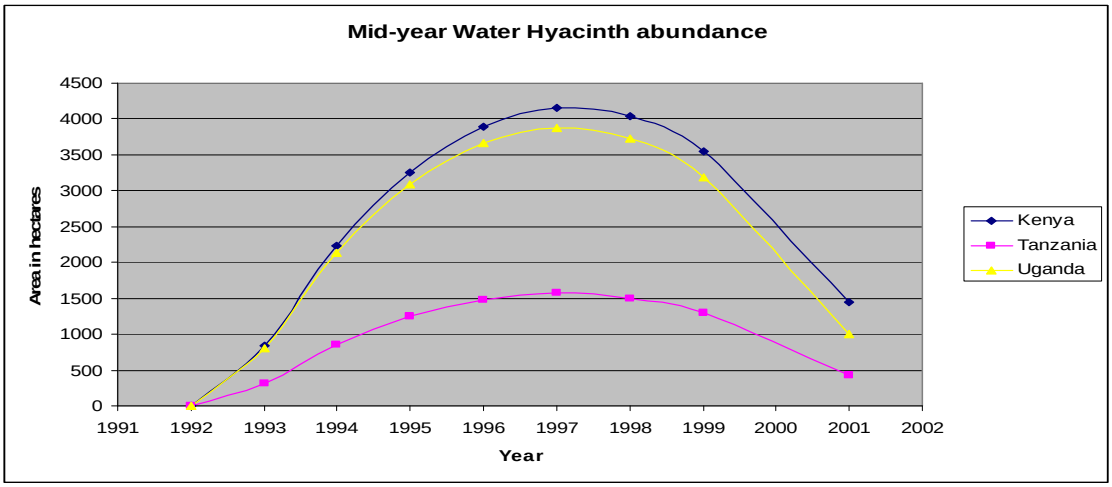


Figure 6.8 Water hyacinth abundance between in 1992-2001. Source: Eseza Kateregga and Thomas Sterner 2006

Table 6.4 Precautionary approach for water hyacinth control			
Comprehensiveness	Interconnectiveness	Strategy	Coordination
Definition and significance			
How the water hyacinth control embraces all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management	Addresses hoe the water hyacinth control considers "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states"	Considers how the water hyacinth control engages in the filtering process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena"	How does the component harmonize its activities to observe fundamental values and targets
Impacts in the basin			
The source of the weed was not originally included in the problem identification. This leads to 'hotspots' weed resurgence in the lake. The aspect of funding of the component activities is not comprehensive	The component addressed the aspects of negative impacts of the weevil used for biological control of the weed. However, country activities on raring of beetles seem apart. There is need to link the weed resurgence to the physical and biological process, especially, the aspect of pollution and eutrophication of the lake.	There is a good strategy in place. Training of community members has been done and serves as extension staff for water hyacinth control. Kagera River continues to discharge the weed into the lake at an estimated 0.8ha per day.	There is poor coordination in the raring of beetles within and among countries. In some countries, nobody has information where the weevils are (Tanzania).

Source: GOU LVEMP 2003; 2005.

Water Quality and Quantity monitoring

Water quality and quantity component focused on the establishment of water quality monitoring system in order to provide qualitative and quantitative information on nutrients, eutrophication and pollution, phytoplankton communities and their composition; algal blooms and their dynamics, lake zooplankton etc. Physically, the lake was degenerated since 1960s in both water quality and its fishery (Kolding et al 2005). This was caused by population increase and its associated socio-economic activities that led to increased deposition of pollutants and nutrients into the lake and the rivers that flow into it.

There was also increased deforestation for agriculture and settlement, industrial development and urbanization in its catchment. These activities increased soil erosion and release of nutrients and pollutants into the lake. The result was pollution, sedimentation and eventual eutrophication of the lake. Socially, the riparian communities in the three member states suffered public health problems. In the 1980s the lake was invaded by water hyacinth weed, *Eichornia crassipes.* (see Ch.4). This created big challenge to socio-economic activities in the lake, waterways and intakes were chocked, fisheries interrupted, lake biodiversity started to decline, toxic algae species became dominant resulting in increase in waterborne and other related diseases.

Studies found that the lake and its feeder rivers are polluted by raw and partially treated municipal and industrial influent, contaminated urban surface runoff and unsanitary settlement conditions of the basin increasing population (Kolding 2005). This led to increase in colliforms of faecal origin, oxygen demanding organic substances, heavy metals: mainly chromium, lead, and mercury, and pesticides. The proliferation of water hyacinth created ideal habitat for biomphilaria snails, host for schistoma responsible for bilharzias among riparian communities. The high population living in abject poverty in the basin survives through subsistence socio-economic activities, creating pressure of land and available natural resources. This has led to inappropriate land-use (overgrazing and deforestation) causing soil erosion with subsequent sedimentation of the lake. The effect has been eutrophication of the lake.

Eutrophication in Lake Victoria is as a result of nitrogen and phosphorus inflows ((Kolding *et al.* 2005). According to Kolding, there was increased phosphorus in deeper lake water, and nitrogen in near shore areas (*Ibid*). According to Hecky (1993) such nutrient loading stimulated 6-8 folds algal growth with domination of heterocystosus, the blue green cynobacteria. This made the lake transparency decline from 5 meters (1930) to 1 meter in the 1990s (Mugidde 1993). Algal growth de-oxygenated the lake water that led to increased sickness for human and animals that took the water. It also clogged water intake filters, increased water treatment costs for urban water supplies, caused near to total loss of deep water species and threatened shallow fisheries through massive killing of fish (due to upwelling of hypoxic water) (Ochumba 1998; Ochumba and Kibaara 1989). The objective of the programme was to elucidate the nature and dynamics of the lake ecosystem through providing detailed information on the characteristics of the waters of Lake Victoria.

The water quality programme under the regime attained the following outputs: established first comprehensive water quality monitoring programme for the Lake Victoria and for any of the great lakes today; created database against which trends are being established, confirmed the lakes parameter variability with respect to algal biomasses and water transparency, established the water balance of the lake i.e. inflows and outflows, established that eutrophication has negative impacts on biodiversity, developed the water quality model (needs further refinement), established the lake mixed fully once a year July/August period, and sedimentation occurs at a rate of 1 mm per year at some locations (Orach-Meza *et al.* 2005).

Table 6.5 Precautionary approach for water quality and quantity monitoring			
Comprehensiveness	Interconnectiveness	Strategy	Coordination
Definition and significance			
How does the water quality component embrace all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management	How does the water quality control address "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states"	How does the components filter process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena"	harmonization of activities to observe fundamental values and targets
Impacts in the basin			
56 monitoring stations were established for the whole lake (Tanzania 28, Uganda 19, Kenya 9). However, data collected has not been comprehensively studied to contribute to management.	Renovated and equipped water quality laboratories in the three countries. Community member not involved: burnt down water quality laboratory in Kenya during 2007-2008 post election violence.	The strategy is not complete as data is still scattered within countries. Not all countries now are collecting data on water quality.	Agreed on common standards for water quality monitoring in the basin. This yet to be achieved as Kenya has no water quality laboratory.

Source: GOU LVEMP 2003; 2005.

Industrial and municipal waste management

The objective of this programme component was to improve management of industrial and municipal effluent, and assess the contribution of urban runoff to lake pollution in order to design alleviation measures. According to Orach-Meza *et al.* (2005) industrial and municipal waste management had all the three countries completed studies on the quality of urban runoff (results in GIS database), conducted inventory of all significant industrial and urban sewer outfalls; developed a hydrodynamic model for inner Murchison Bay and simulation runs predicted costing of water treatment with increasing population (could become untreated

in 7 years), attained 30 per cent increase in waste treatment through rehabilitation of Bugolobi waste treatment plant (Orach-Meza *et al*. 2005).

Table 6.6 Precautionary approach for industrial and municipal waste management			
Comprehensiveness	Interconnectiveness	Strategy	Coordination
Definition and significance			
How does the approach to industrial and waste management embrace all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management	How does the approach addresses "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states"	How is its strategy in terms of filtering process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena"	harmonization of activities to observe fundamental values and targets
Impacts in the basin			
Industries involved in cleaner production technologies through sensitization. There is yet a lot to be done as not all industries have been able to implement this.	The approach lacks interconnectivity. The countries are operating at different levels of industrial waste treatment. There is still raw sewerage disposal in most riparian towns.	The process of effluent standards in all three countries was started. However, they are not yet implemented. The not law yet regulating operations.	The industries under the municipalities are coming up with a joint strategy for waste management. However, it is yet to be implemented by each country.

Source: GOU LVEMP 2003; 2005.

Wetland management

The component emphasized sustainable use of wetlands in order to conserve themas well as improve their buffering capacity. The objective of this programme component was to increase knowledge of wetlands buffering processes and of Lake Victoria wetlands; to determine economic potential of LVB wetlands products; to demonstrate wise use of wetland resources; and develop strategies for wetland management. The wetland management

component of the regime completed comprehensive inventory and ecological characterisation of the wetlands in the basin, documented the cost-benefit of wetlands in the basin and the economic benefits of some wetlands' products, demonstrated sustainable use of wetlands' products to riparian communities, developed strategies and management plans for their sustainable use so as to maximize their buffering capacities (Orach-Meza *et al.* 2005).

Table 6.7 Precautionary approach for wetland management			
Comprehensiveness	Interconnectiveness	Strategy	Coordination
Definition and significance			
Does the wetland management approach embrace all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management.	Does it address interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states.	the filtering process aimed at making management adaptive, anticipatory and more attuned to realities of the political decision arena".	harmonization of activities to observe fundamental values and targets.
Impacts in the basin			
Wetland inventory and research, public awareness on the value of wetlands has been done.	Not yet related to problem solving, not much is going on this component in terms of implementation. a lot of encroachments in riparian urban centres for agriculture and human settlement.	Capacity building, and wetlands wise-use demonstration sites.	Not well coordinated yet.

Source: GOU LVEMP 2003; 2005.

Land Use management

The component emphasized soil and water conservation and appropriate use of agro-chemicals to reduce pollution loading and improve agricultural production. The objective of this intervention was to integrate water quality protection and land use practice in the sustainable management of Lake Victoria. The land use management component established the first measured loads of nutrients and pollutants from agricultural watersheds, urban watershed and from the atmosphere; demonstrated through soil erosion maps erosion hotpot areas, demonstrated approaches to restore vegetative cover in the basin that lead to improved river water quality, demonstrated reduction in soil erosion though soil and water conservation practices, established that atmospheric deposition accounts for 75 per cent of phosphorus load and that DDT, Lindane and Endosulfan residues are available in the atmosphere over the lake although in insignificant levels (Orach-Meza *et al.* 2005).

Table 6.8 Precautionary approach for Land-use and management

Objectives:			
Comprehensiveness	Interconnectiveness	Strategy	Coordination
Definition and significance			
embracing all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management.	Addressing "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states".	the filtering process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena".	harmonization of activities to observe fundamental values and targets.
Impacts in the basin			
74 farmers in Kenya, 516 in Uganda, 354 in Tanzania trained.	Serious soil erosion in the catchment areas and poor agricultural methods.	Nil.	Nil.

Source: GOU LVEMP 2003; 2005.

Catchment Afforestation

The aim of the component was to increase forest cover through tree planting and preventing soil erosion as well as conservation of natural forests. The objective of catchment afforestation was to protect vital parts of Lake Victoria catchment by planting trees involving local communities and institutions. The catchment afforestation interventions under the regime has the following outputs: raised 12 million seedlings with 10, 622, 960 trees planted over 10, 623 hectares with survival rate ranging from 80-85 per cent, created 1, 572.5 hectares of forest reserve, improved 14 forest reserves and rehabilitated 12 community springs; involved communities in monitoring for forest growth, forest regeneration and rehabilitation of bare lands, established a regional working vision for catchment afforestation and prepared management plan for catchment afforestation, and established 82 community based forest tree nurseries (Orach-Meza *et al.* 2005).

Table 6.9 Precautionary approach for catchment afforestation

Objectives:			
Comprehensiveness	Interconnectiveness	Strategy	Coordination
Definition and significance			
embraces all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management.	Addressing "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states".	the filtering process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena".	harmonization of activities to observe fundamental values and targets.
Impacts in the basin			
6.7 million seedlings have been planted, 7 demonstration plot and 58 tree nurseries established. It is not comprehensive	not linked to solutions such as response to siol erosion control, increase in land cover e.t.c.	Nil.	Nil.

Source: GOU LVEMP 2003; 2005.

Institutional framework and capacity building

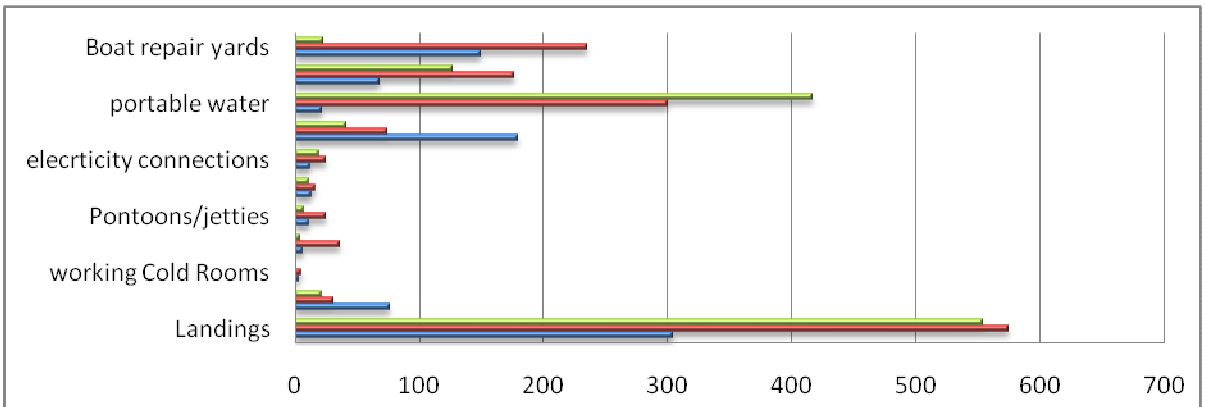
The objective of institutional and capacity building was to install the element of success and continuity of LVEMP through institutional strengthening and human resource development. This component built a critical mass of skilled people, equipment and facilities need to effectively manage the many threats and challenges that affect the lake and its catchment. According to Orach-Meza and colleagues (2005), civil works were in the form of laboratories, offices, fish ponds, weevil rearing ponds, museums, aquaria, and fish landing centres; formal education was conducted at all levels including PhDs., Masters Degrees, Bachelors Degrees, Short courses, and on-the-job training; public awareness was in the form of workshops, seminars, meetings, public media, conferences, and publications; provision of goods and services was in the form of laboratories, filed and office facilities, and learning through technical assistants.

However Bwathondi (2008) observed that, this was not enough to tackle the environmental problem in the basin. He observes that the training was not enough as few scientists were trained. Adongo (2008), the Commissioner Water quality division, Ministry of water and environment, Uganda, asserts that those trained moved away from LVEMP for pastures as they were not bonded. Also, he indicates that many of the scientists were conducting measurements of significant parameters for the first time and this could have significantly affected the precision of data. Less was done on the modelling of the lake. Comprehensive studies on the water movement of the lake and legal issues are lacking (*Ibid*). Tables 6.10 and Figures 6.10 and 6.11 give a summary of institutional capacity built under the regime.

Table 6.10 Institutional capacity built by the regime

Capacity type	Uganda	Kenya	Tanzania
Library capacity	0-4	-	-
Books	8-289	50-100	60-120
conferences	0-100	-	-
computers	0-41	-	3-25
photocopiers	01-07	-	-
internet access	32K	64K	on
Journals	11	-	15
MScs	6.00-26.00		6.00-14
PhDs	3.00-24.00		0-6

Source: Okedi 2008



	Landings	Bandas	working Cold Rooms	Non-working cold rooms	Pontoons/jetties	fish stores	elecrticity connections	toilet facilities	portable water	All weather roads	Boat repair yards
Uganda	554	21	0	4	7	11	19	41	417	127	23
Tanzania	575	31	5	36	25	16	25	74	300	176	235
Kenya	304	76	3	6	11	13	12	179	22	68	149

Figure 6.9 Other kind of infrastructure offered by regime. Source LVEMP, Uganda 2005

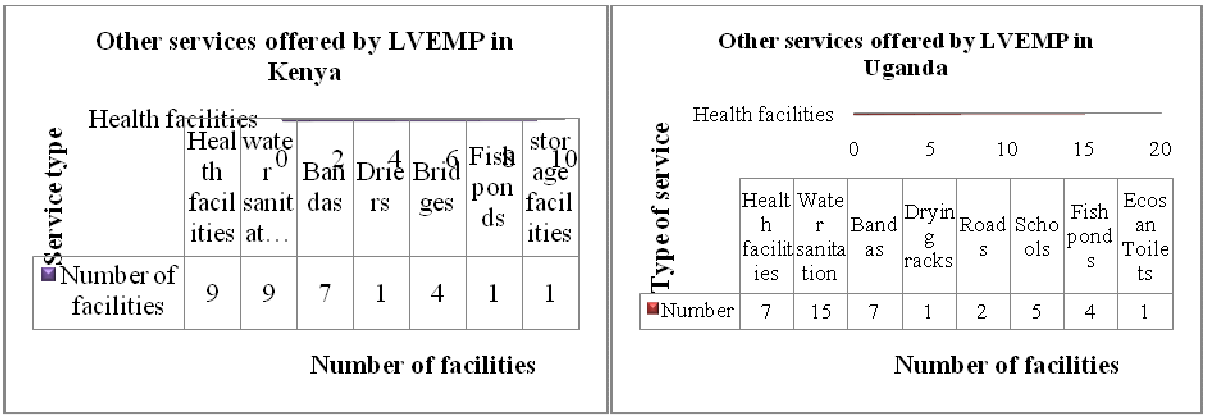


Figure 6.10 Other services to basin states offered by the regime through LVEMP. Source LVEMP, Uganda 2005.

Table 6.10 Precautionary approach for institutional framework and capacity building			
Objectives:			
Comprehensiveness	Interconnectiveness	Strategy	Coordination
Definition and significance			
embracing all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management	Addressing "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states"	the filtering process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena"	harmonization of activities to observe fundamental values and targets
Impacts			
Strengthened environmental analysis facilities in Moi University (K), University of Dar es Salaam (TZ), and Makerere University (Ug). Trained staff 28PhDs, 88Msc., 10 Diplomas and 1487 attended short courses. Not comprehensive, more training needed.	Training was not enough and it was the first time people were going to the lake to take measurements	Nil.	Most of the trained personnel left LVEMP and went for greener pastures.

Source: GOU LVEMP 2003; 2005.

Support to Lake Victoria Fisheries Organization

The objective of the LVFO was to foster cooperation among the partner states of East Africa in matters of Lake Victoria; harmonize national measures for sustainable utilization of living resources of the lake; develop and adopt conservation and management measures to assure the lake's ecosystem health and sustainability of its living resources.

The LVFO established a fully functional secretariat at Jinja, Uganda. It developed a ten year strategic development plan; provided a useful forum for the riparian governments and stakeholders to discuss issues of common interests and to solve conflicts in fisheries became an organ of the East Africa Community on fisheries management of the Lake Victoria and developed the 2000 Lake Victoria Fisheries Convention. In conclusion, the outcome of the precautionary approach attained through the programme components can be summarized in the box below. However, it was very difficult to construct the outcome line of the components as their implementation was disjointed with some activities done in the pilot zones while other were done in the catchment area.

In conclusion, the components are assessed according to their credit i.e. leverage, or attribution: referring to that which is to be credited for the observed changes or results achieved (Gabarino and Holland 2009:vi). It represents the extent to which observed development effects can be attributed to a specific intervention to solving the environmental problem in the basin.

The results of this assessment are shown in Table 6.3. Only two components adopted by the precautionary approach had direct contribution to solving the environmental problem in the

basin. The fisheries management component and support to given to create the Lake Victoria Fisheries Organizations attributed to solving the environmental problem in the basin. The fisheries management implemented projects that directly contributed to reducing the environmental problem in the basin. On the other hand the LVFO component managed to achieve harmonization of fisheries legislation with a running regional headquarter at Jinja, Uganda. Although not directly related to indications of reduction in fishing pressure on the lake, a set of standards of care have been established including the establishment of a legal fishing net mesh size for Lake Victoria. However, much of the regime procedural characteristics can be credited for leverage (influencing change) rather than attributive (causing change) (see Table 6.12).

Table 6.11 Precautionary approach for supporting LVFO

Objectives:

Comprehensiveness	**Interconnectiveness**	**Strategy**	**Coordination**
Definition and significance			
embraces all the critical biophysical, chemical, and human parts of the ecological system; all the significant present and potential uses and objectives for the system; and all the entities-public and private-that are affected or could be affected by management.	Addresses "interrelationships and linkages among the physical and biological processes and components; among multiple, cross cutting, and often conflicting resource uses; and among the many entities that collectively comprised the interests of the partner states".	the filtering process aimed at making joint management adaptive, anticipatory and more attuned to realities of the political decision arena".	harmonization of activities to observe fundamental values and targets.
Impacts			
Set up offices at Jinja, procured vehicles, renovations of buildings, recruited staff, established fisheries standards. However not comprehensive.	Created a data bank but lacks unification among the basin member states.	Planning and coordination of fisheries strategic visions, Harmonization of national activities, workshops and conferences, outreach activities, information, and database management.	Overlaps of roles between LVEMP and LVFO secretariats, LVFO was not seen as an institution under LVEMP.

Source: GOU LVEMP 2003; 2005.

Box 6.6 Summary of impacts of the Lake Victoria environmental regime

Fisheries Management

Completed harmonization of fisheries legislation,
Identified and established closed fishing areas,
Established 325 Beach Management units,
Established 3 fish Quality Assurance Laboratories,
Reduced post-harvest fish losses to 8 per cent,
Some 215 community based micro-projects were established.
Attained three complete Fisheries Frame Surveys 2000/2002/2004,
Completed fish trust levy study
Illegal gear arrested and offenders apprehended

Fisheries research

Extensive biotic field surveys and sample collections;
Taxonomic assessments of sampled fish;
Genetic characterization of some fish species;
Examination of the condition and effects of changing water quality;
Published research results in books and journals;
Introduced four species into fish farming,
Defined the potential for aquaculture in the lake basin,
Assessed the contribution of fisheries to national economies and
Developed a common database (SAMAKI)

Water quality control and monitoring

Established the first comprehensive water quality monitoring programme for the Lake Victoria
Created database against which trends are being established
Confirmed the lake's parameter variability with respect to algal biomasses and water transparency
Established the water balance of the lake i.e. flows and outflows
Established that eutrophication has negative impacts on biodiversity,
Developed the water quality model (needs further refinement)
Established the lake mixed fully once a year July/August period,

Water Hyacinth Control

Physically reduced the water hyacinth weed by 85 per cent
Completed research into the causes of water hyacinth proliferation, its resurgence and effects if sinking dead weed,
Established surveillance system and hot spot areas,
Established 72 weevil rearing centre in the region
Trained local communities to manage them
Established sedimentation occurs at a rate of 1 mm per year at some location

Wetland management

Comprehensive inventory and ecological characterisation of the wetlands in the basin,
Documented the cost-benefit of wetlands in the basin and the economic benefits of some wetlands' products,
Demonstrated sustainable use of wetlands' products to riparian communities,
Developed strategies and management plans for their sustainable use so as to maximize their buffering capacities,

Industrial and municipal waste management

Completed studies on the quality of urban runoff (results in GIS database),
Conducted inventory of all significant industrial and urban sewer outfalls;
Developed a hydrodynamic model for inner Murchison Bay and simulation runs Predicted costing of water treatment with increasing population (could become untreated in 7 years).
Attained 30 per cent increase in waste treatment through rehabilitation of Bugolobi waste treatment plant in Uganda.

Land use management

Established the first measured loads of nutrients and pollutants from agricultural watersheds, urban watershed and from the atmosphere;
Demonstrated through soil erosion maps erosion hotpot areas,
Demonstrated approaches to restore vegetative cover in the basin that lead to improved river water quality,
Demonstrated reduction in soil erosion though soil and water conservation practices,
Established that atmospheric deposition accounts for 75 per cent of phosphorus load
Established that DDT, Lindane and Endosulfan residues are available in the atmosphere over the lake although in insignificant levels,

Catchment Afforestation

Raised 12 million seedlings with 10, 622, 960 trees planted
Covered 10, 623 hectares,
Survival rate ranging from 80-85 per cent,
Created 1, 572.5 hectares of forest reserve,
Improved 14 forest reserves and
Rehabilitated 12 community springs;
Involved communities in monitoring for forest growth, forest regeneration and rehabilitation of bare lands,
Established a regional working vision for catchment afforestation and
Prepared management plan for catchment afforestation, and
Established 82 community based forest tree nurseries

Institutional framework and capacity building

Civil works: Laboratories, Offices, Fish ponds, Weevil rearing ponds, Museums, Aquaria, Fish landing centres;
Formal Education: PhDs., Masters Degrees, Bachelors Degrees, Short courses, and On-the-job training
Public awareness: Workshops, Seminars, Meetings, Public media, Conferences, Publications
Provision of goods and services: Laboratories, Field and office facilities, Learning through technical assistants,

Support to Lake Victoria Fisheries Organization

Established a fully functional secretariat at Jinja, Uganda
Developed a ten year strategic development plan;
Provided a useful forum for the riparian governments and stakeholders
Developed the 2000 Lake Victoria Fisheries Convention.

Source: Orach-Meza *et al.* 2005

Table 6.12 Summary assessment of programme components impacts

Programme Components/precautionary approach intervention	Measurement attributes to problem solving	
	Leverage	Attribution
Fisheries management		✓
Fisheries research	✓	
Water Hyacinth Control	✓	
Water Quality and Quantity monitoring	✓	
Industrial and municipal waste management	✓	
Wetland management	✓	
Land Use management	✓	
Catchment Afforestation	✓	
Institutional framework and capacity building	✓	
Support to Lake Victoria Fisheries Organization		✓

Discussion: The impact of the regime to problem solving

The foregoing analysis has shown the impacts of the Lake Victoria Basin regime. The outputs of both joint management and the adopted precautionary approach are quite convincing that all is almost working well in the basin. However, a closer look at the Phase 1 of implementing the regime suggest joint management is not addressing all the significant present and potential uses and objectives for the basin ecosystem, the joint management is not establishing enough duty for care as a state responsibility or regional responsibility even after conducting a regional transboundary diagnostic analysis. Assessment of problem pressure could have revealed the significant present and potential uses and objectives of the basin system indicates that it was basically an information generation phase meant to provide data for management decision-making. Previous synthesis reports and/evaluation reports by consultants and donor agencies point to successful phase 1 with intended goals attained.

Secondly, the regime is also weak in the involvement of all public and private sectors affected or affecting the basin. Balirwa (2008) asserts, the regime is not widely owned as only few technocrats are involved in its creation and running of its activities. This made LVEMP I to be 'the concern of chosen few' (Balirwa 2008). It created a new organization outside the government system (Mjengera (2008), the National Coordinator LVEMP Water quality component, Tanzania). As such, it underestimated the capacity and impacts of working with parent ministries at the national level.

This can be explained by considering the two main links in the regime, namely: input-output link and the output-impact link. The input-output link considers the results of analyzing regime creation (Ch. 4) and regime architecture (Ch.5). From the analysis, it is evident that the regime has a weak link between its inputs and outputs. The output-impact link considers the regime architecture (Ch.5) and regime impacts (Ch.6). The findings suggest that the substantive and procedural characteristics identified in the regime text were not well addressed during regime implementation to realize significant impacts to account for problem solving. This interfered with the setting of strategic interventions meant to translate into integrated management actions.

Based on the foregone analyses, the link between the basin regime creation, its architecture and its impacts suggests that the cooperation was mainly procedural. The emphasis on process factors in joint management suggests less emphasis on those elements that involved change of attitude. As observed earlier the member states did not observe 'the duty of care' in the regime creation stage. As such, the joint management did not adequately socialize the basin stakeholders on problem factors. The regime was active in cooperation activities such as: attraction of external funding, creation of regional programme, setting of regional

secretariats, and institutionalization of the regime in LVBC. These results also suggest joint management was not comprehensive, lacked interconnectivity, strategy and coordination for holistic/integrated environmental management in the basin.

The outputs from institutional capacity building and fisheries research components were descriptive in nature, and conclusions highly subjective. They were inadequate for demonstration activity as they lacked comprehensiveness and interconnectivity. This analysis finds Phase 1 of the regime implementation was fragmented and not a recipe for integrated holistic management. For example, while the regime's catchment afforestation component was on massive tree planting exercise, there were wide spread illegal, irregular and ill-planned settlements, as well as illegal forest resources extraction in the main catchment forests of the basin. In the Mau Forest complex, a major water catchment area for Lake Victoria, extensive degazettement of forest reserves (excisions) and continuous widespread encroachments that led to the destruction of about 104, 000 hectares representing 24 per cent of the Mau Complex area (see photographs in figures 6.11- 6.12) between 1998 to 2008 (GOK 2008). It is also during the same period that the basin experienced an increasing in fish processing factories, mainly owned by foreign investors (see Figure 6.13).

Figure 6.11 Combined photographs for large scale destruction of the Mau Complex: Source UNEP/KWS/KFWG 2005

Figure 6.12 Photograph of Mau complex excisions for settlement of squatters and extensions of tea plantations: Source GOK, MENR 2008 and UNEP/KWS/KFWG 2005

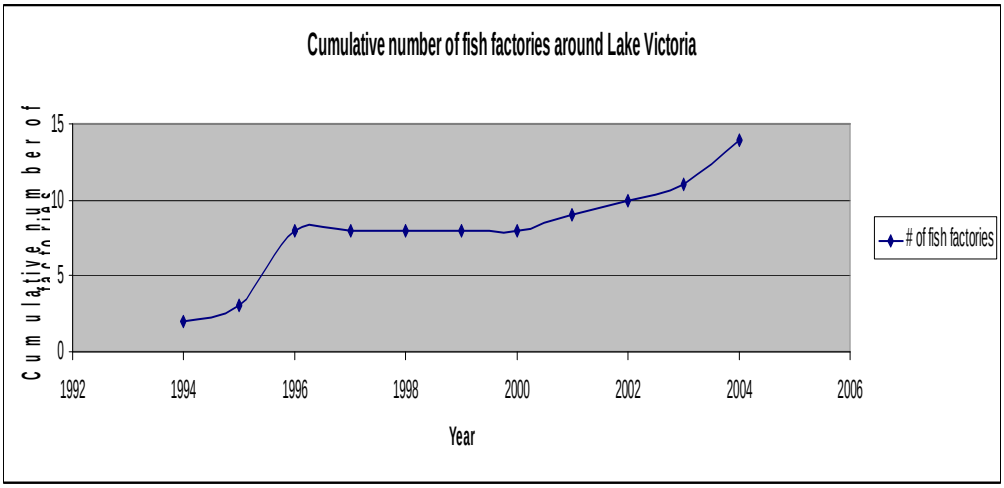


Figure 6.13 Cumulative number of fish factories around Lake Victoria: Source Okedi (2008)

Conclusion

This analysis of regime impacts has shown how the basin regime considered cooperation as the goal rather than joint management. It has shown how the regime emphasized procedural concerns of joint management (such as writing proposals to attract donor funding, creation of regional programme, and setting its organization). Aspects of socializing actors to understand and appreciate the problems of the basin did not form significant aspects of joint management. It has also shown how the donors' interests were mainly infrastructural rather

than change in behaviour. Actually donors wanted to physically see what their money was doing.

The impacts of precautionary approach suggest same findings as those of joint management. The emphasis was on those programme components that involved putting money into use, such as construction of fish ponds, toilets, beach management units, training, e.t.c. There was less emphasis on promoting local environmental initiatives and demonstrative activities to change actors' attitude towards appreciating the basin problems. The effectiveness of these impacts in solving the basin problems is considered in the next chapter.

Chapter Seven

CHAPTER 7

The Effectiveness of the transboundary water regime in the Lake Victoria Basin

Introduction

Chapters 4, 5, and 6 addressed regime creation (inputs), regime architecture (outputs) and regime impacts (impacts) of the basin regime respectively. However, aim of this study, as stated in Chapter 1, is to analyze the effectiveness of transboundary water regime in the Lake Victoria basin. According to the RALP model, the interaction of regime inputs, outputs and impacts can be used to compute regime effectiveness. Hence, this chapter brings together the findings of regime inputs, outputs, and impacts or the three chapters to analyzing how effectively each level addressed its objective, and eventually compute how their interaction addressed the overall objective of the basin regime i.e. global regime effectiveness.

The chapter proceeds as follows: Section 2 is the analysis of 'regime effectiveness as collective action' (regime inputs). Section 3 explores that analysis of 'regime effectiveness as transfer of authority' (regime architecture) while Section 4 explore the analysis of 'regime effectiveness as problem solving' (regime impacts). Section 5 is the computation of global regime effectiveness as derived from 'effectiveness as organization of collective action', 'effectiveness as transfer of authority' and 'effectiveness and effectiveness as problem solving'. The global regime effectiveness is calculated as adequacy of the interactive effectiveness of the three levels to address the basin environmental problem. Section 6 is a discussion of the results and how they can be interpreted to draw conclusions on regime effectiveness. Finally, Section 7 draws the conclusion of the analysis and regime effectiveness in the Lake Victoria.

Analyzing effectiveness as organization of collective action: regime inputs

This section of the chapter explains the results of the analysis for 'effectiveness as collective action' (inputs) in the transboundary water regime in the Lake Victoria Basin. Regime inputs, as observed earlier, refer to the factors that influence regime creation. They have been identified as problem factors and process factors. Problem factors include problem-based aspects (i.e. problem identification and conceptualization) and situation-based aspects (i.e. problem contextualization and problem pressure). Process factors are also known as systemic aspects that include agenda setting, negotiation process and agreement drafting and signing (Chapter 4).

The above generic elements of collection action organization are analyzed based on evidence in Chapter 4 (The creation of Lake Victoria Basin regime). The analysis determined how well activities of each generic element, addressed 'good practice' for effective collective action to creation of the basin regime. The analysis also determines how well the activities of generic elements addressed ideals of integrated or holistic environmental management, namely: comprehensiveness; interconnectivity, coordinative, and strategic (see Chapter 6).

The advantage of considering each generic element is the ability to give attention to particular issues of interest that influence collective action organization for creation of effective regimes. According to the RALP model, generic elements are scored and normalized so that relative weight (with interaction) of each is used to determine its contribution towards the organization of collective action to address the basin environmental problem. Resultant relative weights are used to compare how each contributes towards 'good practice' for effective regime creation. These relative weights are useful in computing the relative effectiveness of the organization of collective action process to address the intended problem.

The following section revisits the computation approach as stated in Chapter 3 and the results are shown in Figure 7.1 (showing the goal, objective, relative weight, and effectiveness of each generic element, and inconsistency index).

Computing relative weights and regime effectiveness

This subsection is a reminder of the regime effectiveness analysis computations (Chapter 3) using Expert Choice 11.5, on how it gives weights to the various components. The weighted and normalized values are combined using linear combination to construct regime effectiveness model. The levels effectiveness score is derived using the formula

$$\mathbf{Ai} = \sum \mathbf{w}_{ij} \mathbf{x} \mathbf{z}_{ij} \quad (1)$$

Where $\mathbf{A}_i$ is standardized value of weights of generic elements at the input level

$\mathbf{w}_{ij}$ is relative weights of generic elements at the input level

$\mathbf{z}_{ij}$ is the normalized weight of generic elements at input level

While the level effectiveness without interaction is computed using the formula:

$$\boldsymbol{\eta} = \sum \mathbf{w}_{ij} \mathbf{x} \mathbf{A}_i \quad (2)$$

Where $\boldsymbol{\eta}$ is

$\sum \mathbf{w}_i$ is summation of relative weights of generic elements at the input level

$\mathbf{A}_i$ is standardized value of weights of generic elements at the input level

The levels effectiveness with interaction is computed using the formula:

$\mathbf{w'_j = w_j \times (1.0 - DI_{ij})}$[18] (Level weight with interaction) (3)

Where $\mathbf{w'_j}$ is relative weight of e.g. input level with interaction

$\mathbf{DI_{tj}}$ is the degree of impact of e.g. input level at the time of analysis, determined by using the formula: $DI_{tj} = SI_{ij} - \mathbf{A_{ij}}$ and $SIij = \sum \mathbf{w_{ij}}$. This means $DItj = \sum \mathbf{w_{ij}} - A_i$

$\mathbf{\eta'_j = \sum w'_j \times A_i}$ (Level effectiveness with interaction) (4)

Where $\mathbf{\eta'_j}$ is

$\mathbf{w'_j}$, defined above

$\mathbf{A_j}$ is standardized weight of e.g. input level

Regime effectiveness ($\mathbf{\eta'_{r)}}$ is a summation of all levels effectiveness

$\mathbf{\eta'_r = \sum \eta'_j}$ (5)

Determining consistency index

A consistency index is defined as an index which indicated how consistent the comparisons were made. The consistency index is defined as:

$\mathbf{CI = (\lambda max - n)/(n-1)}$ (6)

After obtaining the consistency index it is used to determine the Consistency ratio (CR). The CR indicates how consistency our subjective evaluation is performed, relative to the average of matrices generated. If the value of CR is less than 10%, it is considered as very consistent value. Values between 10% and 20% imply acceptable consistency.

[18] Ibid, article 20, Equation 3

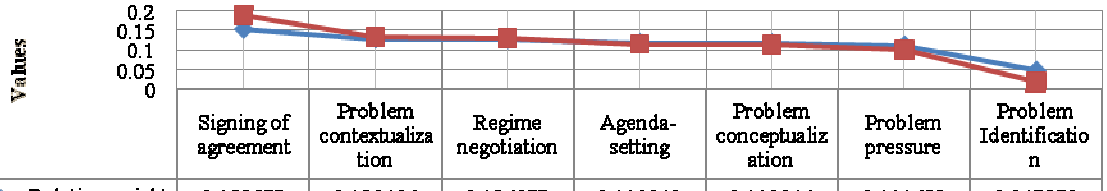
It is calculated as:

$$\mathbf{CR = CI/RCI} \quad (7)$$

Where: **CR**- Consistency ratio

RCI- Random consistency ratio obtained from Tables of random consistency developed by Saaty (1990).

Figure 7.1 Effectiveness as organization of collective action (Inputs) (Inconsistency 0.05)



	Signing of agreement	Problem contextualization	Regime negotiation	Agenda-setting	Problem conceptualization	Problem pressure	Problem Identification
Relative weight	0.152577	0.128486	0.126077	0.118849	0.118046	0.111622	0.047379
Effectiveness	0.19	0.13424	0.129996	0.115292	0.113631	0.10147	0.018408

Goal: effectiveness as organization of collective action (regime creation). Objective: Effectiveness of the regime creation process (inputs).

The results of this analysis show, the process of regime creation was low in conceptualization of problem factors (on average 10 per cent) and somehow concentrated on the process factors (on average 13 per cent). The whole process of collective action for regime creation is found to be limited in the approach to solving the basin problem (all generic elements below 20 per cent effective). Much effort was concentrated on the process aspects of regime creation with the signing of agreement scoring 19 per cent effective. The question is why is this so? A common explanation is that many transboundary water regimes in developing countries are created under the precautionary principle (1992 Rio Declaration, Principle 15). The following subsections show and explain the results of problem factors generic elements.

Problem factors

Problem identification

According to Golightly (1987: 57) problem identification refers to "the recognition and confronting of the field of uncertainty by putting pieces of information together". Alder and Haas (1992:375) defined problem identification as "a natural consequence of how an issue of concern is framed". There has to be consensus that a problem exists. Breitmeier and associates (2006:36) argued that, this is significant as it directs attention to differences among key actors in regarding to their role in causing the problem and their likely vulnerability to the impacts of the problem. The results of analysis for problem identification in the basin are as follows.

This analysis show problem identification accounted for 4.7 per cent (0.047379) of the regime creation process. Why this low? There is need for transboundary cooperation to be purpose driven. While the precautionary approach could have served as a reason for the low effectiveness of the problem factors, the low problem identification underscores the purpose of engaging in precautionary approach. The purpose of the precautionary approach is to address an identified problem before its scientific investigation. It therefore requires actors to have some understanding of the problem they are tackling.

Whereas problems of transboundary water basins are diverse, ranging from pollution, soil erosion, overfishing, deforestation, and conflicts actors' resource use, actors have to contextualize basin problems according to how they affect them at a particular time. It is this context that drives them into cooperation. Swallow *et al.,* (2001) observes collective action for problem identification in transboundary water basins is a complex issue, especially in developing countries. It involves multi-scale and multi-issue analysis (*Ibid*). One has to use

Bull's (1977) 'zoom-in approach': focus on underlying objectives. As such, the low effectiveness on problem identification can be explained as lack of filtering or zoom-in approach to the various problems to derive a comprehensive problem that matched all the actors and their interests before engaging in a precautionary approach.

The most pressing problem at the time of regime creation was water hyacinth infestation over the whole lake that affected transportation, fishing activities and power generation. The vast mats of weed caused concern even to those who were indirectly involved with the lake. It attracted international partners and donor agencies, including EU development partners such as Britain, Finland, Sweden, France and Norway, and the GEF and the World Bank.

Problem conceptualization

As states in Chapter 2, problem conceptualization refers to an integrative strategy to take expertise thinking beyond the facts and singular theories to the level of underlying concepts. Relating concepts of the problem means uncovering interdependent relationships, justifying and displaying differences among them. In a multi-actor problem solving scenario, this is how the problem knowledge is generated and validated (Nikitina 2002). This is crucial in problem solving as it displays coherence and internal consistency on the problem conceptualization. It identifies where one needs to work out with great detail, exactness, or complexity in joint management for problem solving.

This analysis for the activities of problem conceptualization for regime creation in the Lake Victoria Basin scored 12 per cent in effectiveness. The findings suggest problem conceptualization lacked an integrative strategy able to take facts and theories to the level of

problem solving. This is explained by many studies done in the basin, including the regional transboundary diagnosis study (RTDA) concluded in 2005. It is clear from the interviews of key informants that a problem 'conceptual map' has not been drawn even after the diagnostic study. These findings suggest the conceptualization of the basin problem remains fragmented or scattered. For example, whereas the fisheries management component found under the regime has evolved to the level of developing 'standards' and performing prosecutions, head of governments are excising catchments forests to settle the landless and for agricultural expansion (e.g. in the Mau catchment, Kenya). The effectiveness of the other generic elements of collective action organization is as follows: problem contextualization 13 per cent and problem pressure is 11 per cent. The explanation of low performance in these elements is given in Chapter 4.

Process factors

The analysis of process factors generic elements showed improved performance compared to problem factors towards organization of collective action in the basin. Agenda setting was 12 per cent effective, negotiations processes 13 percent effective, and drafting of the agreement and signing scored 15 per cent effectiveness. How do we explain these findings?

As observed in Chapter 4, the Lake Victoria basin is of high concern among the international community. It is a Ramsar site, the largest freshwater and second largest lake in the world. It is also a major source of freshwater fish for Europe and Asia. As such, development partners such as Britain, France, Norway, Sweden, FAO, and UNEP among others have various interests in the basin activities. As such heads of governments, political elites and Non-governmental organization recognized the benefits of scoring high in Agenda setting and negotiations as there were ready donors to the activities going on in the Basin. According to

one of the respondents, the development partners considered the Lake Victoria as an ‘EU fish pond’ supply fish to majority of the EU members. As such, the future of the Lake was important to them.

This analysis found the generic elements of process factors almost 15 per cent effective. This can be explained by the high interest of third parties in the activities of these generic elements. There was ready support from the GEF, WB, and UNEP to foster cooperation among the basin member states. As stated in Chapter 4 grants and loans were made available to create framework agreement that founded LVEMP.

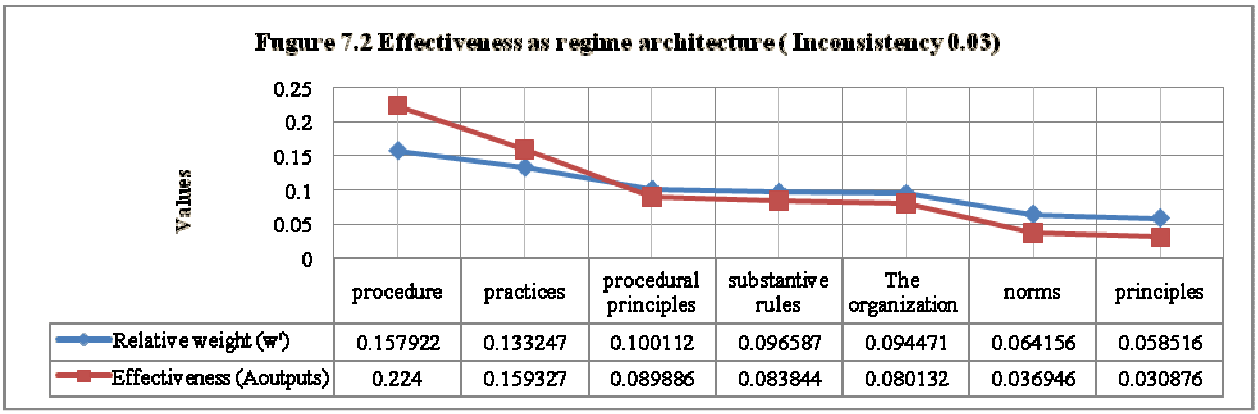
However, the below 20 per cent effectiveness of these generic elements can be explained as follows. The results of regime creation show the agenda for governing the basin environment and related resources was not widely known by majority of the basin stakeholders. The findings suggest it was mainly a political elite activity, supported by some few researchers who were active in the basin either on academic interests or on a line of duty in parent ministries.

As observed in Chapter 4, the initial agenda was raised by Tanzania Finance Minister, who contacted colleagues from the other member states. The main agenda was to cooperate to meet operational directives of donor agencies especially the WB and GEF as learnt from 1992 Rio conference. This agenda was carried further through the interests of member countries chief economists who eventually led to designate the Lake Victoria Basin as ‘Joint Economic Zone’. This suggests, the main agenda of the cooperation was to share the economic benefits of the basin. This later led to the signing of the Lake Victoria Protocol for Sustainable Development (LV protocol) in 2003.

This analysis scores high effectiveness on the signing of agreement because of the success of coming up with the LV Protocol 2003. It is the LV Protocol that found the Lake Victoria Basin Commission (LVBC), the overall regional institution in charge of all matters of the Lake Victoria Basin. The basin environmental regimes now run under the LVBC which is to oversee the implementation of the remaining phases of the Lake Victoria Environmental Management Programme (LVEMP). As observed in the Basin, LVBC is now trying to fill in the gaps left in the problem factors section. The first task was the regional Transboundary Diagnostic Assessment (TDA) which was done in 2007. Secondly, the activities of LVEMP are now institutionalized, unlike before when they were running under individual government secretariats. These parameters related to the evidence shown in Chapter 4.

Analyzing effectiveness as transfer of authority: regime outputs

This evaluation of effectiveness as transfer of authority is based on the analysis of the regime text (see Chapter 5) to identify components of the regime architecture and the criteria established for transfer of authority in the basin. The substantive and procedural characteristics are decomposed to constituent generic elements. The generic elements of procedural characteristics are procedural principles, procedures, practices and organization, while those of substantive characteristics are norms, principles and rules. These enable the analysts to judge the weights of these characteristics in their transfer of authority. The weights of these regime substantial and procedural characteristics are shown in Figure 7.2 below.



Goal: Effectiveness as transfer of authority. Objective: Effectiveness as transfer of authority.

The substantive characteristics

This analysis for substantive characteristics involve evaluation of how the norms, principles and rules of the regime, as identified in Chapter 5. Basically, it analyzes how the substantive characteristics addressed the intended problem of the regime and how well they articulated the dimensions of integrated or holistic environmental management, stated in Chapter 6. The results as shown in Table 7.2 suggest weak performance of the identified substantive characteristics, with all of them attaining below 10 per cent effectiveness. The following subsections explore the results further by considering each substantive characteristic.

Regime norms

The results of analysis show the relative contribution of the regime norms, as standards of behaviour, is 6 per cent (0.064156). The key environmental norm of the regime is *regional cooperation is an essential component of the environmental management of the Lake*, (paragraph 8 APTEMAP preamble; Article 3 LV protocol). As such, the underlying matter of the regime was to cooperate for sustainable utilization. Chapter 5 identified quite a number of norms, as stated in regime instruments, especially the APTEMAP, the EA treaty, the LV protocol and UN Conventions. However, this analysis scored low on norms of the regime.

How is this difference explained? Firstly, a review of the regime creation process barely indicates the sources of the norms stated in the policy instruments. This analysis follows closely the process of regime creation to understand how it contributed to the architecture of the regime. While the regime was originally founded under precautionary approach, the key statements of legitimate transfer of authority in the regime texts do not emerge from the regime creation process (e.g. the LV protocol).

Secondly, cooperation in itself is found enough rather than what it was to accomplish. Cooperation for environmental management is seen as a standard of behaviour for conflict management rather than as a fundamental value to safeguard human dignity. Third, the focus of the norm is not comprehensive as it refers to the lake rather than the basin in the APTEMAP. All the concerns of APTEMAP, as stated in paragraphs 3-12 were just about the lake rather than the whole ecosystem of the basin. This norm guided the joint management (Chapter 5 and 6). In the LV protocol, cooperation is diverse, as it identifies eleven areas of focus for cooperation, including: wildlife conservation, gender, public health, public participation, research navigational safety etc. The norm here is rather fuzzy, however according to Article 3, it can be said to be "conservation and sustainable utilization of the resources of the Basin".

Thirdly, the member states recognized that the Lake Victoria is a shared resource. As such, the guiding principle was equitable *benefit sharing* of the lake resources for development. Paragraph 10 of APTEMAP preamble asserts the interests of the basin states in benefit maximization. It states:

".....Desirous to maximize benefits accruing to the riparian countries from integrated and sustainable utilization of Lake Victoria resources and conservation of global heritage;...."

Benefit sharing guides many interventions within the East Africa Community, including locating of key transnational activities. The basin states come to the negotiation table with the notion of what benefits they accrue from the cooperation. That is why, as the interviewee argued, the regional secretariat for LVEMP was located in Tanzania, LVFO is located at Jinja Uganda, and LVBC headquarters at Kisumu Kenya. While benefit sharing is not bad under joint management as it fulfils the principle of equity, a deeper appreciation of benefit sharing, built on the recognition of fundamental values would be advantageous for transboundary water management.

The importance of norms is their substantive content. Norms are the source of morality as they are the standards of human behaviour. Lack of norms in transboundary water management undermines the establishment of moral standards of behaviour. In such circumstances, it is inevitable some legality aspects are also compromised. As a society without standards of behaviour has no culture. Where there is no culture there is no responsibility. As such, responsible behaviour to establish duty for care is undermined. The result in such circumstances is anarchy. From a constructivist point of view, norms justify action; carry a history of communication among actors; are observable when ascribed by a critical mass of actors; and emerge from domestic scale to be established internationally through international regimes (Finnemore & Sikkink, 1998: 892-893). From a rationalist perspective, norms act as necessary precursors to international accords, but are insufficient to ensure cooperation and are elusive when issues are highly contentious (Furlong 2006:442).

Principles

The principles as indicated in Figure 7.2 contributed 5 per cent (0.058516). In the APTEMAP, the principles were not well elaborated, however, in paragraph 3, the member states recognized the "environmental importance of the Lake Victoria and its significance to the sustainable development of the riparian countries". Paragraph 8 identifies the requirement for "long-term sustained effort", "comprehensive programme addressing the various problems", "national capacity building" and "strengthening existing institutions" etc. All these are statements of causation and rectitude to address the problems of the basin. However, as shown by this analysis (Figure 7.2), the low score for principles needs to be explained. First, the focus as stated earlier was on riparian states and the Lake Victoria. Second, while the norm was cooperation for environmental management of the lake, there was not tangible principle to unite the basin states for environmental management.

In the LV protocol, four main principles are identified in paragraph 1 of Article 4, namely: equitable and reasonable utilization of water resources (Article 5), protection and conservation of the basin and its ecosystems (Article 6), sustainable development of natural resources (Article 7), and sustainable development and management of fisheries resources (Article 8). This analysis identified repetitions in the four principles, for example, considering the wording in the principles: water resources (Art. 5), basin and its ecosystems (Art. 6), natural resources (Art.7), fisheries resources (art. 8). Also, further consider these words in the four principles, equitable and reasonable utilization, conservation and protection, sustainable development, sustainable development and management. The four principles can be referring to the same thing. This suggests limitation in the identification of regime principles.

Paragraph 2 of Article 4, further identifies fourteen sub-principles, some related in some aspects, including principle of sustainable development, principle of prevention to cause harm, principle of prior notification, principle of environmental impact assessment and audit, polluter pay principle, principle of protection and conservation of ecosystems of international watercourses, gender equality principles etc.

So, why is the effectiveness of principles low? Firstly, the analysis of regime creation process did not show how these principles were derived by the actors. Second, the repetitions and fuzziness in many of the principles identified does not reveal their specific relevancy in the regime implementation through the LVEMP programme. This suggests the regime instruments were signed by politicians without much consultation with other stakeholders. It is out of such reasons that the other substantive elements also were very low, e.g. the *substantive rules* contributed 10 per cent (0.096587) (see Figure 7.2). These scores of effectiveness relate to the evidence derived from Chapter 5.

The procedural characteristics

Generally this analysis shows the regime is more of procedural characteristics than substantive characteristics (see Figure 7.2). The regime improved in its procedural elements during regime creation process, including the creation of an agreement, identification of key areas of concern, the writing of projects proposals, the establishment of regional and country secretariats, hiring of man-power and acquisition of funding, equipment, information exchange, establishment of projects in pilot zones. However, the question remains, what could have caused this improvement?

Many factors can be related to this improvement of procedural characteristics. First, the water hyacinth weed had formed mats all over the lake, spreading all over the three riparian countries. As such, normal socio-economic activities were not proceeding well. The immediate agenda was to see how to tackle the problem of water hyacinth weed in the lake. Second, the evidence of ready funding through GEF and WB was vital as an agenda of itself. Money for any form of development or research activities is very much welcome in the basin due to the lack of development funding in the region. This actually made the finance ministers of the three member states to easily initiate the agenda and negotiations for the regime. Third, the operational ordinances of GEF and WB (1994), made it mandatory that to qualify for funding from these organizations, the member states had to cooperate and develop unitary proposal for joint management activities. As such, the improved effectiveness of procedural characteristics was actually a move to fulfil some requirements to attain the much needed funding for many issues in the basin.

The *organizational basis* of the regime contributed 9 per cent (0.094471) while the *procedural principles* also 10 per cent (0.100112). The *regime practice* contributed 13 per cent (0.133247 to transfer of authority with the *procedure* of the regime being 16 per cent (0.157922) effective in transfer of authority. These results are explained by the evidence stated in Chapter 4 and 5.

Analyzing effectiveness as problem solving: regime impacts

The aim of any regime is to produce impacts that fulfil its goals (Vogler 2000). International regime impacts are the consequences of implementation of rules towards solving the problems that led to the formation of the regimes. Analyzing regime impacts involves

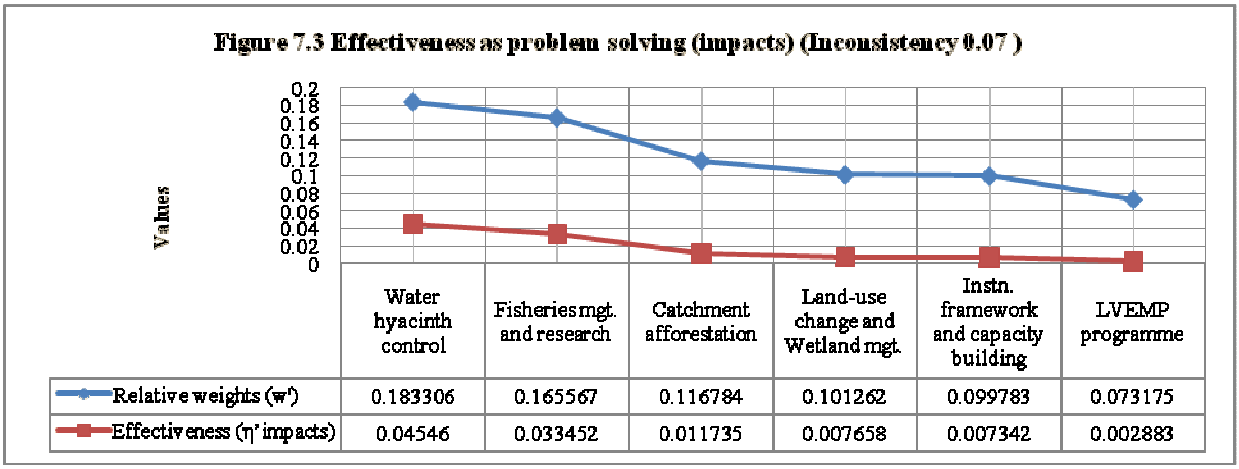
identifying outcomes of substantive and procedural characteristics towards solving intended problems.

The regime impacts are determined from the programme, LVEMP and components. However, as stated in Ch. 2 and 3, impacts could be attributed from changes in biophysical environment and later socio-economic well-being. This impact analysis is based on changes in biophysical environment. The generic elements for this evaluation are identified as the programme components, namely: water hyacinth control (comp 1), fisheries management and fisheries research (comp 2), catchment afforestation (comp 3), land-use change and wetland management (comp 4), institutional capacity building (comp 5), and the overall programme (prog.). However, as observed earlier LVEMP had ten programme components. The choice of five components is based on their relative contribution to problem solving in the basin (see Ch.6).

The objective of the impact analysis was based on changes in biophysical environment and overall consideration of the four dimensions of holistic/integrated environmental management, name comprehensiveness, interconnectivity, the strategy, and coordination. Generally, the analysis for effectiveness as problem solving (based on changes in biophysical environment) indicates relatively low effectiveness scores with the best components, water hyacinth control scoring 4.5 per cent effectiveness (see Figure 7.3) and the overall programme (LVEMP) 0.2 per cent. The relative weights for the programme components is relatively high, as indicated in Figure 7.3. The water hyacinth component is 18 per cent and fisheries research and management 17 per cent respectively. What does this mean in terms of the regime's problem solving capacity?

Firstly, the effectiveness for problem solving for most programme components is low. For example, the water hyacinth control component had 80 per cent weed control in the lake but the problem is not yet solved (see Chapter 4 and 6). According to Bwathondi (2008), the project did not address the source of water hyacinth but used mechanical and biological control methods to remove it from the lake. Chelangu (2007) suggested the following measure among the member states: they should jointly control water hyacinth by building capacity of biological control of water hyacinth in Burundi and Rwanda, the source of the weed. Basin states should research on biological agents that can control water hyacinth in river systems. There is need to continue monitoring, surveillance, and biological control of water hyacinth in hot spots, by involving fishing and core communities.

The *Fisheries management and research component* had 17 per cent relative weight for problem solving. It contributed 3 per cent (0.033452) towards solving the basin problem. The *Catchment afforestation component* had relative weight of 12 per cent and contributed 1.2 per cent. The *Land-use change and wetland management component* had 10 per cent relative weight and contributed 0.7 per cent towards problem solving. The *Institutional capacity building component* has relative weight of 9.9 per cent and its contribution to problem solving was 0.73 per cent. The explanations to these values can be related to evidence presented in Chapter 6.



Goal: Analyzing effectiveness as regime impacts. Objective: Effectiveness as changes in biophysical environment.

The overall programme, LVEMP, had 7.3 per cent relative weight, with its 0.3 per cent effectiveness. These evaluations were at 0.03 inconsistency (see Figure 7.3). How can this be explained? Firstly, according to Chengula (2007) the objectives of LVEMP I were to provide necessary information to improve management of the lake ecosystem, establish mechanisms of cooperative management, identify and demonstrate practical, self sustaining remedies, and build capacity for lake ecosystem management.

Many factors affected the effectiveness of the programme. As stated in Chapters 4 and 6, many of the activities were fragmented, as such, lacked connectivity and comprehensiveness, and didn't have a clear coordinative strategy. According to Mugodo (2008), the period towards the end of LVEMP I saw the highest disorientation of the programme as its assets were divided among member ministries, many of its projects were left unattended. For example, most of the water hyacinth control weevil raring centres have been abandoned.

According to Chelangu and associates (2007), there was a clash of interests among the key funding agents, the WB and GEF. While GEF initiated and financed operations to support regional water public goods the WB focused on poverty reduction and enhancing of

economic growth in riparian countries. This difference in mission objectives and operations reduced LVEMP I effectiveness (*Ibid*).

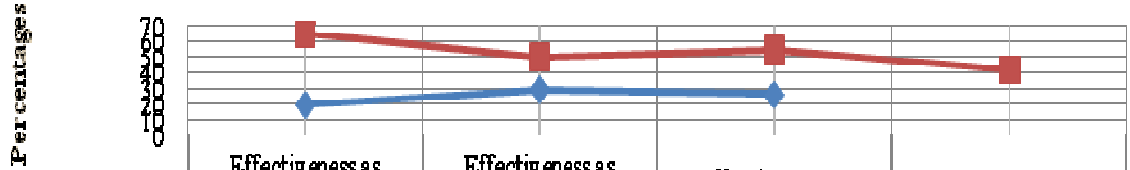
The global effectiveness of the transboundary water regime in the Lake Victoria Basin

The measure of the effectiveness of the transboundary water regime is computed from the interaction effects of the inputs, outputs, outcomes and impacts. As such, the global effectiveness is computed from the effectiveness of the three levels: effectiveness as collective action (inputs), effectiveness as transfer of authority (regime architecture) and effectiveness as problem solving (impacts). These are explored in the following subsections.

The analysis for *effectiveness as regime inputs or collective action* indicates relatively increase in effectiveness in process factors: agenda setting, negotiation and signing of the agreement (APTEMAP). However, the overall contribution of the level to solving the basin environmental problem is 64.5 per cent effectiveness (see Figure 7.4). What does this mean in this analysis? This high effectiveness in collective action can be explained by four main observations can be made. First, the whole process of transboundary water regime creation was based on the principle of precautionary approach (Principle 15 Agenda 21, UNCED 1992). It states that:

> "In order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason of postponing cast-effective measures to prevent environmental degradation".

Figure 7.4 The relationship between Degree of Impact and Effectiveness of the regime



	Effectiveness as collective action (regime creation)- Inputs	Effectiveness as transfer of authority (regime architecture)- Outputs	Effectiveness as problem solving - Impacts	Global effectiveness
% Degree of impact	19.7	29.5	26.1	
% Effectiveness	64.5	49.7	54.7	41.6

Second, the evidence of ready funding through GEF and WB was also significant in the creation of the regime. However, the heads of governments, the political elites, including transnational organizations involved had their own interests over the whole issue. This made their cooperation to create a regime under precautionary approach not a problem. As stated in earlier, the Tanzania Minister of Finance, Mr. Kigoma, after his return from the United Nations Conference on Environment and Human Development (UNCED) 1992, contacted counterparts in the other two riparian countries, Kenya and Uganda, to see how the three states could cooperate to manage the Lake Victoria basin.

Many activities went on without prior considerations of the issue area. On realizing that Global environmental Facility (GEF) could support cooperation for transboundary water management, the political elite in the three member states, came together to pursue a course for illegibility for grants. These grants attracted the heads of governments in the three member states who perceived it as another handout to support the much need socioeconomic development for their countries.

As such, the goal of the cooperation was not internally to solve environmental problem of the Lake Victoria Basin, but to solve the problem of underdevelopment in the basin. However, while the two cannot be divorced, one has to consider what values bind the two together. How this affected the effectiveness of the collective action for regime creation and the overall regime effectiveness is pursued in the discussion section.

Third, the quick evolution of the regime from an agreement to the East Africa Treaty and finally to the Lake Victoria protocol for Sustainable development deserves a high score on the regime. Such a fast evolution depicted the in commonality in interests for the basin. The framework agreement (APTEMAP) was replaced by the EAC treaty which established the LVBP in 2001 and a development and management strategy for the basin in 2001.

The creation of the LV protocol in 2003 also enhanced the effectiveness of collective action. It saw the creation of LVBC which transformed relations into problem identification conceptualization and contextualization through a regional Transboudary Diagnostic Analysis (RTDA) (Chapter 6). The danger of the above assertion is that it portrays the regime is doing some how well in terms of effectiveness as collective action. The exact picture of this is shown by the overall analysis of regime effectiveness.

The *overall effectiveness of the regime architecture* in transfer of authority scored 49.7 per cent (0.497041), with 0.03 inconsistency (see Figure 7.4). From this analysis, it is evident the regime implementation contribute almost a half into the internalization of authority for transboundary water management to the national level. However, one needs to be very careful in interpreting these results, as an almost 50 per cent effectiveness in transfer of authority is relatively a good score. This high level of effectiveness has to be understood whether it is as a result of substantive elements or procedural elements.

As indicated in this analysis, the regime architecture is relatively poor in the effectiveness of substantive elements. As such, key aspects of substance in standards of behaviour and rectitude are not observed in this high effectiveness of transfer of authority. The regime is relatively good in the transfer of authority for implementation among countries. It could also be attributed to the effectiveness of operational directives of funding agencies. Adongo (2008), the Commissioner Water Quality Assessment, Ministry of Water and Environment, Entebbe Uganda argued that WB uses its prominent position to give loans, and loans are given with attachments and conditionalities. Kenya for example did not get its second LVEMP funding from WB because it had not met the requirements (Kitamirike 2008). The analysis for effectiveness as problem solving (regime impacts) is found to be 54.7 percent effective with a degree of impact 26.1 per cent. What does this mean in terms of problem solving?

The *global effectiveness* of the regime is found by adding the levels' effectiveness (three levels of effectiveness analysis), then determining how adequate is this measure in addressing the regime target**.** This analysis shows the overall effectiveness of the transboundary water regime is 41.6 per cent and the degree of impact for the three levels: inputs, outputs and impacts as 19.7 per cent, 29.5 per cent and 26.1 per cent (see Figure 7.4). So, what does this mean? The results of this analysis show the transboundary water regime is fairly effective with a global effectiveness of 41.6 per cent. However, this effectiveness analysis gives further insights on what this figure means. The three levels of analysis reveal the inclination if this global effectiveness towards procedural concerns (see Tables 7.5 and 7.6). There is no doubt that something is going on in the basin, however, the analysis shows to is more inclined to procedure than substance.

The analysis of effectiveness as collective action scored very high effectiveness (64.5 per cent). In fact there is good effort on cooperation to manage the transboundary water basin. This is indicated by the shift from the agreement (APTEMAP), to EAC treaty and eventually LV protocol that founded the LVBC, the basin unifying institution. While this effort deserves commendation the question remains what is the substance in this effort? This analysis shows that there is very little concern for substantive content of the regime. There is something intrinsic that giving impetus to this collective action that. The results have shown low considerations on problem identification even after the TDA 2007. This suggests that the basin is not unified by fundamental values to serve human dignity.

The results for effectiveness as transfer of authority or regime architecture indicate low values for substantive elements: norms and principles and relatively high values for substantive elements: procedural principles, procedure and practice, and organization. While procedural elements are supposed to be implementing the substantive elements, this analysis reveals how something rather than the substantive elements drive the procedural elements to this success. In other words, the source of the drive for the basin politicians and elites to heed to key procedural characteristics seems surprising in a regime which that has not identified its key substantive elements. As such, there must be something intrinsic in the context or the regime that makes the procedure and practice, including organizational protocols to be effective. While several explanations can be put forward for this divergence, these results show that the norm guiding these activities does not lie with the basin regime.

The global effectiveness of 41.6 per cent is attributed to fulfilment of procedural requirements in all the three levels (see Table 7.4). However, the substance of this procedural

success is yet to be identified within the basin transboundary water regime creation process. As indicated in Chapter 4, the source of the regime was not from within the basin but from the 1992 Rio conference. The evidence of funding in transboundary water basins management and development was in itself a norm for regime creation in majority of the developing countries sharing water basins than the norm of sustainable utilization and management of transboundary water basins. While this may seem to over stated, the nature of lack of activities and deterioration of projects in the period between the close of LVEMP I and the beginning of LVEMP II indicates the lack of substances in current activities. Most LVEMP activities came to a standstill because either there was delay or no more funding from the WB. As such, the 41.6 per cent effectiveness is not sustainable as it is entirely the result of third party intervention in the basin activities.

While the substance driving the compliance of the member states to procedural characteristics remain to be identified, key suspects can be linked the general poverty and lack of funding for national development in the region. As such states will be willing to follow the procedure of any third party who will put funding for development on the table. This is the case with the current funding of LVEMP II. WB is funding the operations of the second phase of the transboundary water regime in the basin under its Investing Lending instrument (ILI) i.e. the Bank provides consultancy, guidance and support through expertise in implement key aspects of the programme.

The effectiveness of the Lake Victoria Basin regime: discussion

Drawing from the RALP model, regime effectiveness is dependent on how effectively inputs are realised and so are the effects of impacts dependent on how effectively outputs are

realised. It is from these levels' interaction that the effectiveness of the basin environmental regime is analyzed. This was done by first scoring the generic elements of the levels then computing their strength of interaction. However, according to Muller and Fairlie-Clarke (2001), studies on interaction usually compute the strength of hierarchy levels as wholesome, and take values in the range of 0 to 1. As such, the values of the distinct hierarchies, sum to a unit (1) (*Ibid*). However, it will be wrong to sum a level's effectiveness to a value between 0 and 1 in analyzing the effectiveness of international regimes using the RALP model. Under normal circumstances, it would imply the summation of the effectiveness of the regime levels would always be 1, in this sense meaning highly effective regime or complete regime. Such perfect regimes are rare or inexistent.

To avoid the above scenario this study, through AHP approach (Chapter 3), assessed the correlation factors of generic elements that constitute a regime level, based on how each contributed towards attaining the goal of each particular regime level. Correlation factors are weightings that represent the proportional effect that each generic element or component has on a parent issue or level of regime development process. The correlations were converted to relative weightings to show how each generic element behaved relation to attaining the level target. The overall level strength of interation SI_j, degree of impact DI_j, and effectiveness η_j, were computed (see Tables 7.1, 7.2, and 7.3).

The relationship between a level's strength of interaction (SI_j), degree of impact (DI_j) and effectiveness (η_j) can be used to conclude the general effectiveness of the regime.[19] The generic elements' strength of interaction determines the degree of impact and therefore effectiveness in attaining the level goal. The interaction of the levels determines the regime

[19] This study borrows a similar reasoning from Muller and Fairlie-Clarke 2001: Using AHP to determine the correlation of product issues to profit. *European Journal of Marketing Vol.35, No. 7/8*

effectiveness. To tackle this problem, interacting regime levels can be decoupled by assuming that each level attains 100 per cent effective in realizing its goal. This means therefore regime effectiveness for a successful regime, will be 100 per cent. The complete weights of the generic elements and levels can be modified to account for their 'incomplete interaction'. This modification is derived from the degree of impact, computed from the strength of interaction of the generic elements (Muller and Fairlie-Clarke 2001). The interacting generic elements produce cumulative effect that benefits the attainment of the level goal.

Effectiveness is the potential of each level i.e. inputs, outputs, and impacts for problem solving. The quality of each level does not contribute equally to the overall effectiveness of the regime as indicated above (see Table 1, 2, and three). A level with high interaction effect (SI) = 1, has degree of impact DI = 1 and its effectiveness E = 1. If strength of interaction SI = 0, degree of impact DI = 0, effectiveness E = 0, these are boundary conditions. A successful or effective regime will have high levels strength of interaction (SI), high degree of impact of the levels. The degree of impact of the regime is summation of the levels' degree of impact, however, the overall effectiveness will always be below 1 (Muller and Fairlie-Clarke 2001, modified). A higher degree of impact does not definitely correspond to regime effectiveness. Figure 7.4 shows the relationship between the regime impacts and its effectiveness in the Lake Victoria basin.

In this study as established earlier, regimes are considered incomplete (as they mature with time, see Chapter 1) and their hierarchical levels are therefore incomplete (local). This justifies the claim that all regime effectiveness analysis is 'partial'. It is for this reason that the computation of strength and effectiveness of regime levels must take care of interaction among the levels, to qualify a hierarchy. The degree of impact of each level in attaining its

goal depends on the strength of interaction of its generic elements. The effectiveness of each level determines the potential of the regime in solving its intended problem. The overall contribution of a regime to solving its intended problem is the summation of the levels effectiveness with 'interaction'. The effectiveness of a regime is determined by calculating the adequacy of the effect of the regime in solving its intended problem.

This analysis has shown that transboundary water regime effectiveness analysis is a function of effectiveness as collective action, effectiveness as regime architecture, and effectiveness as problem solving. The effectiveness as collective action or regime inputs is very important as it identifies the scope of stakeholder involvement, the context and the problem to be solved. Transboundary water management involves collective action of a range of actors, not just basin states but also subnational groups, international and transnational organizations (Klaphake and Scheumann 2006). They assert that effective collective action in transboundary water involves fostering collective action at multiple scales. As such, different types of collective action emerge and become a political issue.

From the foregoing background, this analysis for *effectiveness of collective action* for transboundary water regime creation explore aspects of the regime making process that would link the scope of actors, their contexts, and at the same time stand convincing to their political interests. This analysis explored the problem factors and process factors with a view to fulfilling human integrity and meeting fundamental values. It draws from the liberal scholarship of international law and policy, based on the understanding that law making is not just to devise a system of rules to regulate state behaviour, but it is part of international policy making process (see Chapter 2). As such, the effectiveness of collective action at the transboundary basin level should be perceived as an endeavour to fashion a world public

order. The effectiveness of creating such a law should be analyzed for how effectively it promotes core community values (see Chapter 2).

Collective action for transboundary regime creation has been dominated by the preferences or interests, capabilities and beliefs that states have consented. This approach to regime creation cloaks the tough moral choices that need to be faced in developing a functioning world order. According to Armstrong and associates (2007) these choices reflect conflicting values. "The values that serve the interests of most community members –in particular human dignity must take priority so as to develop a stable and sustainable world public order" (*Ibid*).

As such, collective action should address 'good practice' to fulfil this criterion. It is from this basis that this analysis for effectiveness of collective action for regime creation in the Lake Victoria Basin is conducted. Collective action effectiveness analysis therefore depends on deep appreciation of the issue area in regards to human dignity, and how the power and influence different actors affect it (*Ibid*). The following section states the results of this analysis. Poor problem identification means poor stakeholder involvement in regime creation which compromises the effectiveness as regime architecture and effectiveness as regime problem solving or impacts. Problem identification guides decision makers on policy discourse as well as decision on choice of appropriate norms and appropriate institutions within which to resolve or manage problems (Chapter 2).

The Report of the Commission on Global Governance (1995: 251-253) calls for trusteeship in the management of the commons. Such varied governance arrangements call for assessing regime effectiveness in terms of the extent to which rules and decisions are internationalized (Commission on Global Governance 1995: 251-253). Ultimate effectiveness must relate to

the problem under consideration and the extent to which it can be solved by a regime (Vogler 2000:155). This must involve the relevance of the underlying purposes of the regime in terms of norms and principles in problem solving.

Swallow and associates (2007) observed that regime creation in transboundary water basins, especially in developing countries needs to appreciate the diverse stakeholders, their power and influence relations. They indicate "individuals need to work together to share common water points; upstream land users and downstream water consumers need to manage and resolve conflicts over water quality and quantity; while all the industries, framing communities, urban residents and public agencies that have interest in resolving environmental quality need to agree on development and conservation objectives and approaches at the basin level. Lack of attention to the action resources available to the different actors in participating forum runs the risk of legitimizing the status quo" (*Ibid*).

Based on the analysis, it can be concluded that the high level of effectiveness as regime inputs was just a process of legitimizing the status quo in the basin. When the effectiveness as regime creation was subjected to the four dimensions of the integrated environmental management, the process factors and problem factors indicated significant deficits in their comprehensiveness, interconnectivity, strategy and coordination.

The collective action process for regime creation in the basin lacked in the aspects Swallow and his associates pointed out as significant in creating an effective legitimate system to manage the basin. While, evidence is shown in Chapter 6 how the whole regime was an undertaking of political right individuals and political elites, cross-scale collective action was missing (*Ibid*).

In the Lake Victoria Basin people live, interact and earn livelihoods three zones-the upland zone, the midland and the lowland zones. Spanning these zones are river basins, national and international institutions governing water, land and forest management. Together, the interactions between and within the zones determine the level and distribution of welfare, as well as environmental outcomes. To attain such goals, the creation of an effective transboundary water regime need to be focused on human dignity and key fundamental values rather than individuals' interests. To attain this success, a collective action for regime creation has to comprehensively address the problem factors: problem identification, conceptualization, contextualization and pressure. If these aspects of the collective action could score highly in the regime creation process, it would inform the substance of the regime architecture, which would lead to changes in status quo.

This analysis found the effectiveness as collective action to be relatively low. The agreement did not contained general sets of commitments which created frameworks for the negotiation of more specialized accords in the form of framework-protocols to manage specific issues of natural and environmental resources degradation in the basin. The regime, as indicated earlier was not therefore a multilateral environmental agreement that formed a core for specific social institutions to cement the regime i.e. a persistent set of regional and international rules, including Operational Ordinances of funding agencies (formal and informal), that prescribed behavioural roles, constrained activity and shaped expectations.

The analysis for *effectiveness as regime architecture* indicates the substantive and procedural elements of the basin environmental regime are found to be operating below average on their ability to transfer authority from the international level to national. The analysis for

effectiveness as transfer of authority reveals how the basin stakeholders did not understand how to interpret the 'duty of care' as a source of law for guiding due diligence approach. This analysis has shown 'the duty of care' was not internalized during the regime creation stages, especially in the substantive characteristics, to set the framework for precautionary approach (see Ch.5). As such the regime is concentrated in laying the foundation of precaution approach, as shown by the procedural characteristics that led to the creation of APTEMAP, and eventually, the Lake Victoria Environmental Programme (LVEMP), with less emphasis on the measures to attaining the 'duty of care' by partner states. The creation of a regime that started an environmental management programme in the basin is not the same as setting a regime to care and address the environmental problems in the basin.

The regime's emphasis was in creation of an environmental programme than instilling the duty for care of the environment. The Lake Victoria Environmental Management Programme (LVEMP) is a clear indication of how international community in the region is coming to terms with the need to protect international environment of transboundary water basins. How this is done under the traditional principles of international law is still questionable (see Chapter 5)

From this regime analysis, international assistance is attained by establishing substantive and procedural elements that make national governments change their practice. Due to the limitations of the effectiveness of regime creation process (level 1), the regime architecture (level 2) miss some key aspects of transfer of authority. In the basin, as stated earlier, the regime creation did not establish well the problem concept and context. The member states responded to the basin problem through a precautionary approach after experiencing the

invasion of water hyacinth, the hampered transportation and fisheries activities, and the interference with hydro-electric power generation activities.

There are many studies that have been done and still being done in the basin, however available knowledge remains scattered and fragmented. It has not been embedded to create understanding of the problem into socio-economic welfare terms for comprehensive problem contextualization (Chapter 6). Regionally, the environmental shocks realised in the basin have been read as disasters (Rabi, 1996), than events that have been building out of long overdue lack of due care. The massive invasion of water hyacinth was considered a disaster that head of governments had to come together to address the situation. The same was sounded when the Lake Victoria water levels started falling. Recently, the invasion of Migingo Island of Kenya by Uganda was due to declining fisheries resources in the basin.

It is clear from Chapter 4 that the agenda-setting creation of APTEMAP was not particularly driven by clear understanding of the problem, calling on member states to do something, but was driven by the need to successfully create a programme for tripartite environmental management. As such the negotiations were not based on checking those activities which caused environmental degradation but who was eligible to host the programme secretariat and, where was the donor money to be kept from for the programme activities: at programme's regional secretariat or by member governments. Each government kept its own accounts of the donor money and implemented the programme individually. The country working groups wrote the regime text after consultations of appointed with appointed government officers and later signed by the member states' foreign ministers. This approach to regime creation impacted negatively the effectiveness of the basin environmental regime.

On the other hand, this analysis scored the regime very low on the effectiveness as transfer of authority. The analysis showed there was no clear international policy coordination in the basin (Chapter 5). The three member states were at different levels in regards to environmental legislation (Chapter 4). Uganda was so much ahead of Kenya and Tanzania in terms of enacting environmental legislation and addressing issues that faced Lake Victoria. Also, the implementation of the programme activities was not at the same pace due to country political interferences, especially Kenya and Uganda (see Ch.4). For example, Kenya had to transfer its national secretariat from the Office of the President to the Kenya Agricultural Research Institute (KARI) while Tanzania had no national secretariat (Mugodo 2008: The National Executive Secretary, LVEMP Tanzania).

Also basin-wide information exchange failed to establish an obligatory or strong use of channels to inform other states of one's practices with respect to the regime targets. As such there was lack of comprehensive regular and expected use of basin-wide forums to achieve greater coordination of national policies in the various components of the regime programme, except for fisheries research and management that attained a sectoral convention (Balirwa 2008). Although there are various committees of ministers from key ministries that are now getting involved in environmental matters in the region, the initial institutionalization of international environmental management in the basin did not so much involve policy makers but scientists and programme officers (*Ibid*).

The aspect of *effectiveness as problem solving or impacts* has been assessed based on judgements of what was required for the maintenance of health environment, social wellbeing and development of the basin by looking at improvements of the biophysical environment. As such, it involved corresponding assessment of the performance of the implemented

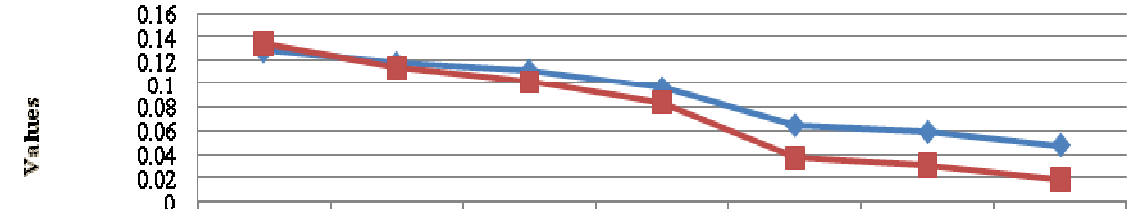
programme components. However, according to Koenig-Archibugi (2003), the interaction between various actors pursuing common goals are structured. Structure represents the link between the demand and the supply of international governance (Koenig-Archibugi 2003: 50). The assessment of the overall effectiveness of the basin regime was done across the whole regime structure.

As observed by Kolding and others (2005), and Bwathondi 2008, the results and analytical outputs for the Phase 1 of the regime implementation indicate fragmentations hence not recipe for integrated holistic management. As Kolding and colleagues (2005) observed in their fisheries synthesis report for Lake Victoria that there was lack of prioritization in research which led to large output of data and scientific papers, with some duplications of findings. This has interfered with setting of strategic interventions that would translate into integrated management actions (*Ibid*).

On the other hand the regime implementation as observed earlier on did not observe the duty of care while implementing its due diligence course. While the regime's catchment afforestation component was on massive tree planting exercise, there were wide spread illegal, irregular and ill-planned settlements, as well as illegal forest resources extraction in the main catchment forests of the basin. For example, in the Mau Forest complex, a major water catchment area for Lake Victoria, experienced extensive degazettement of forest reserves (excisions) and continuous widespread encroachments that led to the destruction of about 104, 000 hectares representing 24 per cent of the Mau Complex area (see photographs Chapter 6) between 1998 to 2008 (GOK 2008). It is also during the same period that the basin experienced an increasing in fish processing factories, mainly owned by foreign investors (see Chapter 6).

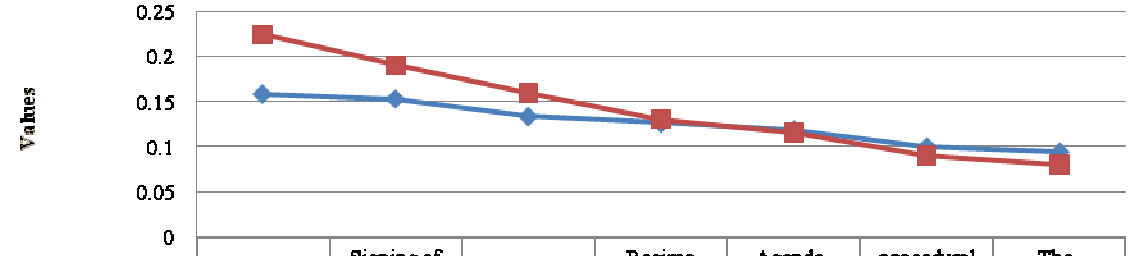
On the other hand, a question to ask here is what are the advantages of a transboundary water regime dominated by third party interventions? The key advantage is that, third party intervention leads to significant lessons in the transboundary water management. While the problem was initially not identified and norms set, a learning process has taken place that has led to improvements in problem conceptualization, problem contextualization and an understanding of problem pressure. Lessons are generated from research activities in the basin. In terms of regime architecture, the regime has important lessons in substantive rules, the procedure of treaty negotiations and writing and signing of agreements (see Figures 7.5 and 7.6). However, there is hope that this learning will lead to identification of regime substantive elements. These lessons point to the realised success of phase one of the regime implementation (LVEMP I) regardless of its fragmentation and teething problems.

Figure 7.5 The characteristics of substantive concerns



	Problem contextualization	Problem conceptualization	Problem pressure	substantive rules	norms	principles	Problem Identification
Relative weigt	0.128486	0.118046	0.111622	0.096587	0.064156	0.058516	0.047379
Effectiveness	0.13424	0.113631	0.10147	0.083844	0.036946	0.030876	0.018408

Figure 7.6 The characteristics of procedural concerns



	procedure	Signing of agreement	practices	Regime negotiation	Agenda-setting	procedural principles	The organization
Relative weigt	0.157922	0.152577	0.133247	0.126077	0.118849	0.100112	0.094471
Effectiveness	0.224	0.19	0.159327	0.129996	0.115292	0.089886	0.080132

Conclusions

This chapter has analyzed regime effectiveness in the Lake Victoria basin by subjectively, determining correlation factors or weights to regime constituents. The transboundary water regime global effectiveness is calculated as performance to attaining intended regime goals. By employing AHP, it decomposed, judged and synthesized the transboundary water regime into its evolution levels, cause-and-effect mechanisms, generic elements and their weights to determine, strength of interaction, degree of impact, and regime effectiveness. The analysis has shown that the Lake Victoria environmental regime, i.e. APTEMAP and related instruments (the EA Treaty 1999 and LV protocol 2003), has a global effectiveness of 41.6 per cent that is more inclined to procedural characteristics or substance of third party interventions. It has identified the advantages and disadvantages of this kind of regime.

Internationally, while collective action may be more desirable to address shared problems, the international system is believed to be institutionally and administratively too weak to mobilize sufficient political pressure on states to act (Keohane 2003). As a result, effective management of shared problems is weak or inadequate to protect the environment. Majority regimes have failed partly because parts of their hierarchy have not been effectively executed

or have been created as a ‘spontaneous order’ type (Young 1982). A spontaneous order is a type of regime that is a product of the actions of actors but not the result of human design (Lewis 1969; Hayek 1973; Schelling 1978, Young 1982, and Keohane 2003). Such institutions are not as a result of conscious coordination among participants. However, Young (1982:282) voices there are numerous cases of spontaneous order type of regimes in which subjects expectations converge in to a remarkable degree in the absence of conscious or even explicit awareness.

It is evident from this analysis that the transboundary water regime in the Lake Victoria Basin was created as a ‘spontaneous order’ and therefore struggling to attain set goals. For example, the problem identification process i.e. the recognition and dealing with the field of uncertainty by putting pieces of information together is yet to be executed. As such, there is yet some struggle in problem conceptualization: an integrative strategy to take expertise thinking beyond the facts and singular theories to the level of underlying concepts, and contextualization: the process of embedding the knowledge about the problem into socio-economic welfare.

This chapter employed AHP and Expert Choice to analyze the effectiveness of transboundary water regime in the Lake Victoria Basins. Regimes are considered dynamic and hierarchical processes that interact to influence behaviour to address problems in transboundary water management. It employed the RALP model: an analytic and prescriptive tool to analyze the effectiveness of the environmental regime in the basin. According to the model the regime is split into three levels in a hierarchy namely: inputs (regime creation), outputs (regime characteristics), and impacts (regime effects of implementation). It also draws a simple understanding that these hierarchical levels are made up of generic elements or component.

The strength of interaction of these components, and the degree of impact of each level significantly influences the effectiveness of the transboundary water regime in attaining its intended goals. As such, this chapter derived the global effectiveness of the transboundary water regime in the basin by summing three levels of effectiveness, namely: effectiveness as collective action (inputs) as 64.5 per cent, effectiveness as transfer of authority (outputs) as 49.7 per cent , and effectiveness as problem solving (impacts) as 54.7 per cent. The adequacy of the overall regime effectiveness in attaining the regime target was determined to come up with the global effectiveness of the transboundary water regime. The global effectiveness of the basin regime was found to be 41.6 per cent, highly influenced by procedural characteristics of third party interventions. The advantages and the disadvantages of the regime were drawn. Chapter 8 draws conclusion of this study and suggests recommendations for reforms in the Lake Victoria Basin environmental regime.

Chapter Eight

CHAPTER 8

The Effectiveness of the Lake Victoria Basin Regime: Conclusions and Policy Recommendations

Introduction

This thesis has sought to contribute to the global environmental governance reforms agenda by illuminating the need for targets reforms as informed by effectiveness analyses. Despite significant effort in recent decades, there is still a growing awareness the battle to reduce ecological unsustainability is being lost in many countries (Castro 2007). This thesis, has explored the following research questions. Firstly, how was the regime created in the Lake Victoria Basin? Secondly, what is the regime's architecture? Thirdly, what is the impact of the regime, based on implementation of Phase 1 of the Lake Victoria Environmental Management Programme (LVEMP 1)? Lastly, how effective has the regime been and what policy recommendations can be derived to improve the functioning of the regime in the future?

This thesis first reflected on the problem-solving capacity of transboundary water governance by employing a regime effectiveness approach. The review, Chapter 2, indicated that whereas recent analyses of transboundary water regimes have concentrated on *constrained maximization* approach to focus attention on the public interest of the problem as well as main actors, they lack a sufficiently strong account of cause-and-effect mechanisms to maximize regime effectiveness.

To overcome this, Carlson (2003) asserted the need for an approach whose strength depends on its explanation power, orienting its thinking to context-mechanisms-outcomes. In this thesis I have asserted that an AHP methodology offers valuable opportunities through its principles of decomposition, synthesis and judgement (Chapter 3). Using this methodology, a Regime Analytic Levels Process (RALP) model was devised to perform transboundary water regime effectiveness analyses (Chapter 1&3).

Using RALP model revealed that, the water regime in the Lake Victoria Basin fails to provide a 'duty of care' for the environment and related natural resources. The emerging impacts and effects of regime are not sustainable and are not readily effective in helping decision-makers to address intended problems (Chapters 6 and 7).

The rest of this final chapter discusses the evidence from these levels in order to draw policy and legal recommendations for reforms of the regime. It unfolds as follows. Section two explores Level 1 (i.e. regime inputs). Section three addresses Level 2 (i.e. regime outputs). Section 4 four considers Level 3 (regime impacts). Section five examines the overall effectiveness of the regime. Section six offers a theoretical reflection on these findings. The findings are examined through the three theoretical lenses of realism, constructivism, and structuralism. Section seven offers a discussion of whole study, drawing conclusions on the global regime effectiveness as reasoned by each of the three theoretical lenses. Section eight considers the scope for further research in regime effectiveness.

Inputs: how was the transboundary environmental regime in the Lake Victoria Basin created?

Chapter 2 showed there is a lack of prescriptive studies on transboundary water regimes in Africa. It also showed how such studies have focused more on descriptive evaluation and assessment aspects of effectiveness, than prescriptive analytical effectiveness analyses. This thesis has shown just how complex and passive the process of transboundary water regime creation is in Africa. It suggests that transboundary water regime creation in the basin is still mainly driven by donor agencies, states and state elites. They constitute what Yohannes (2008) calls "the alpha and omega of regional integration with the market seen as the sole problem solver". In other words transboundary water regime is a 'bandwagon' of operational directives of international funding agencies.

So how are these findings informed by the RALP model? Firstly, the understanding that regimes are initiated by starting with inputs, then outputs, outcomes and impacts seem to be not supported by the evidence in this analysis. While it formally started with cooperation to create agreements, e.g. the APTEMAP, these produced few substantive concerns that have been fully internalized by actors concerned. While this might either be the wish of the member states and respective communities, the determining factor is the availability of funds.

Secondly, where do we locate the transboundary water regime in the RALP model? It shows that the regime is mainly at the outcomes level. What this means is, the regime is more involved in implementation of activities to justify its operations, than environmental problem solving per se.

Thirdly, the main consequence of this is that, activities will not be sustainable as they lack substantive input and support from the people who were meant to be involved. Local people see the activities demanded by the regime as government, or World Bank sponsored, not as activities that will change their lives and the environment. Even just a short while after the regime finance started to tail off the phase 1 infrastructure of the regime is collapsing. Of course this presents an opportunity to produce strategic action plans to embed the regime. With good understanding, the donor inputs can in theory be utilized to promote a new round of problem identification, conceptualization, and contextualization to generate new substantive characteristics i.e. norms, principles, and rules. By doing this, donor funding will target the real source of the problem (social practice at the local level) rather than 'white elephant projects' that few people feel ownership for.

Regime Outputs: ***What is the regime architecture? (Outputs)***

The analysis has revealed that the regime is stronger in procedural characteristics than in substantive ones (see Chapter 7). Member states have to meet the interests of development partners to qualify for the much needed funding. As such, the regime is basically procedural rather than substantive. The underlying sources of norms and principles stated in the LV Protocol are not being targeted by the regime creation process. This therefore suggests that fundamental values have not been sufficiently internalized in the regime creation process to create and sustain a 'the duty of care'. The emphasis of third party interventions (development partners and donor agencies) in the basin is focused on 'procedure' at the expense of 'substance'.

So what do these results suggest in terms of the internalization of regime architecture or the effectiveness as transfer of authority? While donor community and development partners are

pushing for their operational directives to be implemented effectively, the basin member states need to conceptualize and contextualize the data collected and lessons learnt to provide usable knowledge. These lessons could lead to basin wide creation of norms, principles and substantive rules that can effectively establish 'duty of care' to govern the basin.

Impacts: w*hat are the impacts of the regime?*

As noted above, the regime is stronger in its procedural characteristics than its substantive ones (see Chapter 7). In other words, regime impacts are greater in relation to those activities which involve the fulfilment of procedures than those in which stakeholders have to fulfil a 'duty of care'. For example, the water hyacinth control project was recorded to have an 80 per cent success in terms of removing the weed through biological and mechanical means, About 558 Beach Management Units established, personnel trained, water quality control laboratories renovated, etc. Yet water pollution remains unabated. Other procedural activities with significant impact include reafforestation: some 6.7 million trees have been planted in the region, yet deforestation of catchments continues.

What do these findings suggest? Activities which involved putting money into getting people involved were fairly well done. But activities which involved changing behaviour and attitude were fairly unaffected.

Global regime effectiveness: *how effective is the transboundary water regime?*

The analysis shows the Lake Victoria environmental regime, i.e. APTEMAP and related instruments, has a global effectiveness of 41.6 per cent. This analysis tried to locate the effectiveness of the transboundary water regime in the stability and smooth running of the

basin. As such, the regime is expected to provide substantive rules to meet common expectations for states' conduct and to provide a process to communicate crises and co-operate on technical terms to serve fundamental value for all i.e. the survival of humanity (see Armstrong *et al.* 2007). However, in terms of inputs and outputs, the regime is mainly procedural, highly dependent on third party interventions such as the World Bank, hence the score of less than 50 per cent. The regime in the basin is struggling to recognize mutually constitutive functions of power and law in social order to meet different groups' values and possibilities for progressive social development.

Theoretical reflections

This analysis of transboundary water regime effectiveness is grounded in a *neoliberal institutionalist* approach (Chapter 2). What additional light do alternative theories, such as: realism, constructivism and structuralism shed on regime effectiveness? The following subsections focus on effectiveness as regime creation (inputs), transfer of authority (outputs), problem solving (regime impacts), and the global effectiveness, from the perspective of these three additional theoretical lenses.

Effectiveness as regime creation in the Lake Victoria Basin

Neoliberal institutionalism assumes that institutions are persistent and connected sets of rules (formal or informal) that prescribe behavioural roles, constrain activity and shape actors expectations (Keohane 1989:3). As such states must have common interest in cooperation for it to succeed. This is based on the assumption that states are rational actors and participate in

regime building to promote long term interests. However, this was not actually the case with Lake Victoria regime. The analysis did not locate the basis for long term interest to establish persistent and connected set of rules that prescribe behavioural roles.

The stakeholders' perceptions remained very diverse. While the donor community wanted to see the basin united to conserve and manage its natural resources for socio-economic development, the member states treated the donor agencies as a ready source of development funds. Their aim was to enhance resource exploitation to meet food self-sufficiency and poverty alleviation, not protect the basin per se.

According to the realist lens, states are assumed to be the major actors in world politics and that anarchy serves as a major constraint that shapes states preferences and actions. According to this analysis, this realist assumption tends to differ in the Lake Victoria basin. States are not the major actors, donor agencies and development partners are the major actors. Also states preferences and actions were more unified: food self-sufficiency and poverty alleviation. As such they had one target, to acquire funding to meet their intended goal. In the basin cooperation was not really an issue. The member states have had a long history of being united on many issues (see Chapter 4).

The realist lens in international law also argues that the creation and persistence of a regime is dependent on the influence and participation of a single powerful state or , the hegemon. This assumption is relevant in understanding cooperative arrangements as restricted instruments in power politics (Mearsheimer 1994; Grieco 1995). However, this analysis indicated how the theory of hydro-hegemony is more applicable in the basin. The regime is a

clear example of how power and ‘donor-centrism’ still provide the broad parameters within which the transboundary water regime creation takes place. As stated earlier, it was the development partners and donor agencies that influenced the creation of transboundary water regime in the basin.

Constructivism rejects many realist assumptions and instead adopts a sociological approach to the analysis of transboundary water regimes. It identifies material factors such as distribution of power in the international system and explains them in the context of social structures. As such it considers the ‘logic’ of anarchy as being socially constructed; it also rejects the assumption that states are utility maximizers with precise interests that can be promoted through cooperation. Instead it claims that focus should on the formation and evolution of identities and norms associated with process of institution building (see Chapter 2).

According to Emmer 2006, such knowledge is crucial in the creation of basin regimes. According to this view substantive concerns in the basin, such as problem identification, conceptualization and contextualization (things that would supply new knowledge for the formation and evolution of identities to inform regime building) are yet to be accomplished in the basin. Whereas donor operational directives and states interests have dominated the basin procedural concerns, the member states have to focus effort into acquiring knowledge of substantive concerns that will unite the basin in attaining its environmental conservation goals. While there is evidence of a lot of basin research being geared towards understanding key concepts and context of the basin environmental problem, there is yet need to contextualize research finding into information that would be useful of regime building. The current regime is rather a collection of ‘expert’ interests with less connection to the values of

local stakeholders.

The structuralist lens assumes states have their well-developed conceptions of interests that bring to negotiations for regime creation (Hay 2002:102). Structuralists argue preferences will be less clear and stable when issues are complex, knowledge uncertain and material interests are weakly or affected (Stokke 1998:132-3). Science is given greater attention in identification of the existence of causes or solutions to environmental problems (Hay 2002).

It is through structural forces that elites in the basin construct the knowledge underlying scientific laws of nature to build a view of problems. The thesis identified how stakeholders recognize the value of institutions (such as APTEMAP, EA Treaty, and LV protocol, (see Appendices)) as mechanisms for reducing barriers to state cooperation for the purpose of environmental management. However, structural theoretical insights are still to be employed by the basin regime. In summary therefore all three theoretical lenses offer additional insights into the analysis of effectiveness as collective action for transboundary water regime creation.

Effectiveness as transfer of authority in the Lake Victoria Basin

This thesis studied the effectiveness of transfer of authority from a neo-liberal institutionalism perspective. It highlighted the moral and legal aspects adopted by the various stakeholders in the basin through identifying the various activities among actors in the basin. It demonstrated the relevance of fundamental moral values and challenged the core legal theory principles that law should be separated from morality (Armstrong *et al.* 2007)

By Contrast, realists argue that states are the only significant actors, and second, the

international system which is anarchic is fiercely competitive (Schweller 1998; Mearsheimer 2001). Third, material factors matter far more than non-material factors such as: norms, institutions, and international law. Fourth, states are rational actors, and rational action ultimately depends on self-help (Waltz 1979). Fifth, realism has a systematic focus (Brooks 1997).

This thesis has revealed how the basin states are not rational actors but rather vehicles of preference advancements by domestic and international constituencies (see Armstrong *et* al., 2007). They separate law from everyday politics and moral debates and focus on what they are doing to survive. The realist lens indicated that politics influenced many activities in the basin. Even when donors' operational directives drive activities in the basin, many activities are still controlled by states' politics.

On the other hand constructivism focuses on the importance of social structures that include knowledge, institutions, identities, norms and rules. As such it explains the normative and social structures believed to determine social behaviour of actors (Armstrong *et al.* 2007). Much constructivist analysis is directed towards explaining what realism and neoliberal institutionalism cannot explain. In regime architecture analysis, it concentrates on the sources and substance of international law (Kennedy 1988). Constructivism helpfully draws attention to the role of norms (ethical, political, and legal,) (Finnemore *et al*. 2001: 139), and the process of progressive normative change. According to Armstrong *et al.* (2007), when there is lack of norm following, there is need for agency.

Constructivism emphasizes that in the basin there are multiple stakeholders with diverse interests. It suggests that basin regime is more of a procedural concern, founded on states

interests and donor demands. Basically, the analysis did not identify any binding commitment among basin member states based on fundamental values, apart from their willingness to cooperate. Cooperation in the basin is not founded on environmental and resource management, but economic incentives.

As such, the impetus to cooperate for environmental management is from operational directives of development partners and donor agencies, not internalized through any significant transfer of authority. In other words, the regime has not yet developed as a social structure with defined practice. As indicated above, the regime is a creature of donors, the states and state elites. There has not yet been much information sharing and learning amongst the relevant stakeholders. However, the theory does draw attention to the process of normative change in the basin.

While this analysis suggests the regime is at the outcome level within the RALP model, third party intervention can be used to supply knowledge relevant for the creation of substantive elements. Through strategic action plans, efforts can be focused on problem identification, conceptualization, and contextualization. These would supply the much needed knowledge to ensure a long-term internalization of ‘duty of care’. As such, constructivism indicates how the regime could be developed from the outcomes level to inputs and outputs.

The structuralism lens accounts for regularities in observed patterns of political behaviour in a given context (Hay 2002:102). It considers systematic logics operating among independent contexts. As such, it appeals to holistic or integrated approach to basin management. By employing structuralism theory the basin regime architecture is analyzed for substantive

characteristics by defining conceptual and contextual linkages among the various contexts subjectively. As such, it appeals to explanations of behaviour (Hay 2002: 106).

According to structuralists, the findings suggest limited identification of the various contextual and conceptual linkages in the basin i.e. social, economic and ecological linkages. As such, the regime is still in the process of building knowledge on the linkages between the various contexts. The findings also suggest limitations in the building of the transboundary water regime between the third parties and basin member states. While this can serve as evidence for effective north-south relations in transboundary water governance, this study did not focus much attention in this area. However, the theory helps to understand the transfer of authority through third party interventions in the basin. In conclusion, the three theoretical perspectives provide significant insights in the analysis of transboundary water regime architecture in the basin.

Effectiveness as problem solving (regime impacts)

According to neo-liberal institutional theory, regimes are supposed to gradually lessen anarchy among basin states by internationalizing of substantive and procedural elements. On the other hand realists see problem solving in terms of coercion. Impacts are made through the imposition of operational directives developed by the powerful states (Armstrong et.al., 2007). This mode of operation has been the approach to problem solving in the Lake Victoria basin. Powerful states, through their funding of the World Bank, have been able to institute some activities and infrastructure to solve some degradation problems. Some deviant nations (e.g. Kenya in LVEMP phase I) were even denied funding to make them comply. Such coercive approach in problem solving produces tangible results in the long run if there is

positive learning and transformation. However, the findings shows how unsustainable are the impacts of such an approach due to its neglect of substantive characteristics.

On the other hand, constructivists focus less on the functional dimensions of transboundary water regimes, and more on the processes through which where actors are socialized into identifying and following of norms (Armstrong et.al., 2007). This socialization process involved elite learning new norms and internalizing them into community discourse (*Ibid*). According to constructivists this could have produced positive impacts in the basin. Through third party intervention, the basin elites could have generated research that sheds more light on problems in the basin and thus support for stronger management of the basin. However, this thesis found that more learning has to be done to focus the regime impacts on fundamental issues of human survival.

Structuralism lens see transboundary water regime impacts in terms of a reflection of the relationship between structure (the regime), agency (human organizations), context (the basin) and conduct (the human behaviour). According to Hay (2002: 166), actors must interpret their context in order to act strategically. The findings suggest the impacts of the regime are according to the strategic interactions between the structure, agency, context and conduct. This evaluation of regime impacts has enabled this study to analyse the global effectiveness of the regime. It is through structuralism lens that current impacts inform the nature of the regime and where it has to be improved. This interpretation through structuralism brings all the theoretical lenses together to show the overall impact of the regime. The findings suggest how the transboundary water regime is more agent-centred and struggling to impact the intended problem in the basin.

Global regime effectiveness

According to the neo-liberal institutionalists, transboundary water regimes are sustained by strategic order (Byer 1999; Armstrong *et al*. 2007). It should be directed towards promoting core community values and performs multiple functions (Armstrong *et al*. 2007). However, this thesis has shown that the regime in the basin has not yet attained this level of effectiveness. The aspect of fairness has not yet been internalized by the current regime due to its reliance on third party intervention.

The realist lens considers transboundary water regimes as rather insignificant. It considers regime effectiveness as a function of power relations based on the result of coercion. Realists therefore prefer looser and more flexible transboundary regimes (see Chapter 2). The findings suggest this kind of transboundary water regime in the Lake Victoria Basin whose effectiveness is more based on procedure than fundamental values of human survival.

Constructivism explains regime effectiveness from a more social perspective. Regime effectiveness is seen as arising from the internalization of social norms and identities. Norms are intersubjective beliefs about social and material world that indicate to actors what they should do in given circumstances. These beliefs are not only about social rules and conventions, but also about the physical world and the laws of science (Kratochwil 1998). As such they include beliefs about what is right and proper and beliefs about what is doable and effective (Eden 2004). This thesis suggests the actors are yet to identify key norms that would unite all the stakeholders. Elite learning has not yet reached the level of identifying and internalizing the basin norm. The regime, as observed is too procedural in nature.

Finally structuralists see transboundary water regime effectiveness as a result of persuasion, congruence and habit (Chapter 2). According to Gallespie (1997) transnational epistemic communities help to bring about what amounts to normative paradigm shift over issues ranging from moral rights to obligations of the poor and the rich. The finding suggests a closer link of the current approach to attain effectiveness in this manner. Basin elites have entered into activities that could lead to normative paradigm shift in the basin. However, the approach to attain this goal is yet to be internalized in the basin.

In summary, the analysis suggests the three 'theoretical lenses' offer different but actually quite complementary perspectives. As such, a 'hybrid' of these three could be constructed to inform future effectiveness analyses.

Validity

The acid test of regime effectiveness is how regimes affect the problems they are intended to solve. This involves clear identification and elaboration of cause-and-effect mechanisms (see Chapter 3). The logic of validation employed here, as stated in Chapter 3, uses the method of subobjectives and the causal proximity method to tackle this problem. Internal validity is based on the method of subobjectives i.e. decomposition through the notion of causation. Causation as defined in Chapter 3, is studied by identifying subobjectives or generic elements within and across regime levels that influence regime effectiveness.

This study employed an AHP methodology (Chapter 3), which through its principle of decomposition, the Lake Victoria regime was decomposed into inputs, outputs and impacts.

These levels were further decomposed to their generic elements or subobjectives. The relationship between regime inputs and regime effectiveness is often a factual-causal relation and not a physical one (Mohr 1995: 269). By decomposing outputs and impacts to their subobjectives, it creates between them links i.e. input-output-impact-effectiveness. However, in regime cycle situation, these links create physical mechanisms (Mohr 1995). For example regime creation (inputs) and regime effectiveness in problem solving are not directly physically related.

By identifying the substantive characteristics of the regime and the procedural characteristics of the regime it provides motivation or operative reason to identify a force towards the regime effects (impacts). This method is not fool proof but does lead to a greater confidence about causation (Mohr, 1995: 255). By understanding these physical mechanisms we are able to see more compelling picture of the effects of the regime towards problem solving (regime effectiveness).

A second logic of validation for internal validity is through the *modus operandi* method. Reasons can be causes of intentional behaviour (Mohr 1995:264). However, there might be many good reasons for doing a lot of different things at a given time, it is therefore important to flesh out the reason that actually operates to produce the effect i.e. the notion of operative reason or *modus operandi*. Reason here refers to causes that neither the operative reason itself nor the factor that make it strong, is part of anyone's thought (Mohr 1995: 265). As such operative reasons are physical reasons as they are not mental constructs (*Ibid*: 266).

According to Mohr (1995), validation of qualitative studies is more appropriately attained through physical causal reasoning (Chapter 5). Physical causal reasoning is when there is no counterfactual involved but has to do with force and motion (Chapter 3). Through analysis of occurrences, actors' behaviour, and resulting events leading to the creation and implementation of regimes, strong operating reasons are identified to attribute to the effectiveness of the Lake Victoria basin, environmental regime. By using the *modus operandi* method, it is possible to eliminate other causes that might have influenced the observed changes of behaviour in the basin.

However, Mohr observed, physical causal reasoning alone does not make it necessary that the observed effect is due to the regime alone. To account for the regime effects, this study employed the notion of causal proximity. Causal proximity refers to a causal distance that is close. Causal distance is defined as the combined likelihood that an event will follow another if nothing intervenes and that nothing will intervene (Chapter 3).

In this study, the analysis of regime creation (inputs), the regime architecture (outputs) and regime impacts (impacts) and their effects were assessed from the subobjectives identified (see Chapters 4, 5 and 6). Out of these subobjectives, causal proximities were assessed of the relationship between these subobjectives and the main objectives for regime creation. The causal distances were expressed in the form of weights derived through Expert Choice software. Causal proximities were also assessed through 'inconsistency of subjectivity', the equivalent of significant levels in statistical analysis, determined through Expert Choice (see Chapter 7).

External validity is hard to explore in a within-case study such as the one offered in this thesis. However, this study used both the method of subobjectives and theoretical triangulation to improve the external validity of the study (Chapter 3). Theoretical triangulation is when theoretical perspectives of the data are cross-checked, (Burgess 1982:163). It involves checking the theoretical propositions of the results of the study with what similar studies have theorized. The following causal links are explored to show validity of this study's main findings.

Regime effectiveness analysis without cause-and-effect mechanisms

Regime Creation —1— Regime Effectiveness

In the above link the causal distance seems too long or great. As such, the relation is a bit weak to yield high confidence in the inference of regime effectiveness. Through splitting the regime more links are identified. These links have the effect of activating two mechanisms, namely: a strong relationship and causal proximity. These mechanisms are important in evaluation of the study internal and external validity (see Mohr 1995: 259).

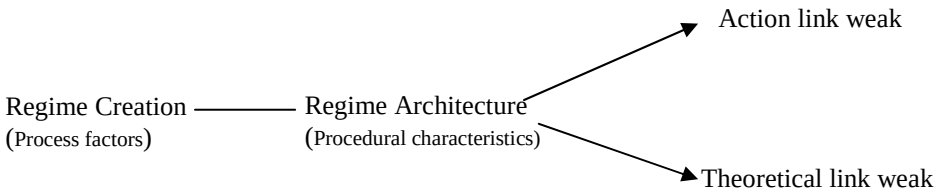
Two logics can be identified from these additional links developed from employing the method of sub-objectives. First the logic of the programme i.e. if we know regime creation or inputs affects regime architecture that affect regime impacts and overall regime effectiveness (from Chapters 1 and 2). Second is the logic of validation i.e. whether the relationship in the links is causal. If regime creation results in regime architecture, and regime architecture into regime impacts, and impacts into regime effectiveness, then there is logic of validation. This

is from widespread views that may be understood as the case from the theory explicated in Chapter 2.

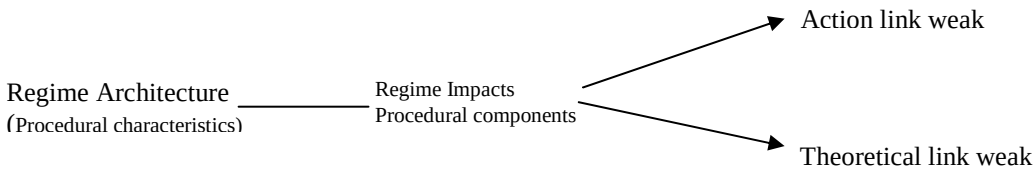
By employing the method of sub-objectives the following links were identified (see the RALP Model)

Regime Creation —1— Regime Architecture —2— Regime Impacts —3— Regime Effectiveness

This thesis suggests that the Lake Victoria Basin regime creation process was not natural, or pre-ordained. The precautionary principle (1992 Rio Declaration, Principle 15) has become the dominated practice for transboundary water governance. As such, it undermines effective organization of collective action for creation of transboundary water regimes. The process factors were more dominant than problem factors thus regime architecture is not neutral. The findings suggest the regime architecture is dominated by procedural characteristics that consists of operational directives of third party interventions. Theoretically, such linkage takes the realism hydro-hegemony stability theory whose regime architecture show a weak relationship to regime practice (see theoretical reflections section) This can be illustrated in the link below



On the other hand, the findings suggest the regime architecture mainly procedural, influenced those programme components which were procedural in natural (regime impacts)



According to Mohr (1995: 259), not only is internal validity strengthened by the method of sub-objectives, but so is external validity. He argues:

> "the more thorough one understands the causal mechanisms by which a treatment has affected an outcome in one case, the better the position one is in to know when a similar outcome will result in another case".

The above illustrations are derived from the analysis of this study, and illustrate the internal and external validity of this study.

However, there are certain aspects this study did not consider. These could be issues for further research. First, it did not investigate all the stakeholders in the basin. It mainly focused on elite interviews and documents. Second, there is need for a further examination of "hybrid trajectories of theoretical and empirical dimensions" (Lockwood and Davidson 2009) in the analysis of regime effectiveness. Third, the transformative concerns in promoting social justice through more equitable, more inclusive, and more harmonious management of the basin's environment and natural resources was not addressed. More resources could, for example, have made this study more participatory with direct involvement and input from stakeholders in things like focus groups. Also, the ontological premise was limiting, especially in relation to the analysis of regime impacts which could have benefited from a more interpretive approach. As such, "multi-paradigmatic approach drawing on interpretive

and critical paradigms to create hybrid research methodologies for exploration and intervention aimed at improving social conditions" in the basin would be an obvious next step (see Taylor 2008: 887).

Nevertheless, the findings do inform transboundary water management particularly in situations characterized by high input of development partners. It suggests how basin states could utilize third party interventions to internalize substantive elements for managing common pool resources.

In terms of recommendations the following seem appropriate. First, the basin member states need to focus the regime on the 'duty of care' and establish PoMs. Whereas there are many regimes addressing various aspects of the environment and natural resources in the Ease Africa Community as a whole, there seem to be less government control on how these instruments address the problems they are intended to address. Political interests take a central concern than issues of fundamental value. To be effective these instruments will have substantive aspects of their creation.

There is also need to include local legal advice in the creation of international instruments. The findings suggest the basin instruments lack clear understanding of legal concepts such as legal norms, principles, and rules; what is substance or procedure in an international instrument. As such, there is need to re-write current legal instruments, especially in the Lake Victoria basin, to address substantive aspects of stakeholders.

Second, they should establish more secure sources of funding to ensure sustained long-term effort. When the future of governance interventions of such essential resources as water, is dependent on donor funding, shows how much value we attach to our natural heritage. Basin governments allocate huge sums of money to activities of political concerns than in governing such essential resources as. Member states should strive to include basin activities in their annual budget allocations so that programmes can be sustainable.

Thirdly, they should link substantive elements to procedural elements. The implement of the programme did not address the link between substantive and procedural concerns. The review in this study has indicated how the two are related and therefore important to be linked for effective programme implementation. This also relates to funding agencies, especially the World Bank. There is need of caution when the Bank applies its investment lending operational directive, I suggest, this has to be renegotiated depending on the prevailing circumstances, and stakeholders' input is significant if the Bank's financial assistance is to address real life problems and be sustainable. Lastly, merge the regime with wider national activities of environmental management in the basin.

Final thoughts

The common perception of transboundary water regime scholars is that mutual cooperation of nation states is rational and thus possible when the payoffs from cooperation exceed the gains from non cooperation (Klaphake and Scheumann 2006). According to Nicol (2002: 168) while states often cooperate in the field of water management, this should not be an excuse for complacency in the face of complex and often rapidly increasing demand for strategic access to water. As Swain (2004) noted, international agreements on water are commonly either ignored, or not implemented in full.

The analysis offered in this thesis has shed new light on strategically important but under researched regime- that in the Lake Victoria Basin of East Africa. According to Yohannes (2008: 77) any discussion to hydrological governance in the Lake Victoria basin must originate from a shared understanding of the potential collision between the growing human needs for renewable resources and the weakening of the regenerative capacity of the basins hydro-ecology. "This requires the reconfiguration of authority, the democratization of knowledge, and the deterritorialization of nature" he writes (*Ibid*: 77). It is evident from the analysis presented here that the basin states have to meet considerable hydrological, environmental, political, economic, and social challenges to improve the prospects of internal progress, regional stability, and basin wide environmental sustainability. However, Yohannes posed two additional questions which are very relevant to the creation of effective environmental regime in the region. First, do the basin states have the political will, institutional capacity, legislative framework, programmatic vision, and adequate resources to conserve and sustainably use the basin resources and the water of the Lake Victoria? Second, do other sources of nonfarm income exist, apart from fisheries and timber harvesting?

This thesis has shed some light to answer some of these questions. The results suggest the lack of institutional capacity and financial resources to address the problem of environmental degradation in the basin. It has also shown how there is little understanding of formulating policy instruments to address shared resources in the basin. The second questions on alternative sources of income tend to run away from the perspective of holistic or integrated resource management. There is nothing as an alternative when it comes to the environment. Fisheries and timber harvesting are all related when we address them from the hydrologic

cycle point of view. As such, neither can be an alternative of the other, but complement each when considered under holistic resource management.

This study focused on four research questions. Second, it identified a conceptual framework or research model, the RALP model, through which three levels of the basin regime, namely: inputs, outputs and impacts, were investigated. Third, it used the evidence from the three investigated levels to derive understanding of the environmental regime effectiveness in the Lake Victoria basin. Fourth, it employed three alternative theories namely realism, constructivism and structuralism, to examine the regime.

The findings in relation to regime *inputs* show the three member states Kenya, Uganda and Tanzania cooperated to create APTEMAP and then LV Protocol. They strengthened the already created LVFO, the fisheries regime, within the context of the broadening regional environmental cooperation (Chapter 4 and 5). The evidence collected in this thesis and by Yohannes (2008), shows the governments of these three states and their international partners reached a global consensus that the problem of environmental degradation in the basin could be resolved only in the context of broader harmonization of national programs, comprehensive cooperation among all stakeholders, and regional integration (GEF 2005). However, this study finds that this is yet to be attained.

The Lake Victoria basin is managed by politically low-key group of experts whose effort led to the adoption of the semi-constitutionalized agreement on the preparation of tripartite environmental management programme (APTEMAP) for Lake Victoria. While the regime

has been expanded to include Rwanda and Burundi, the need for democratized asymmetries in bargaining power to address emerging regional environmental problems remain scattered.

In terms of wider scholarship, this study points to two new directions in which regime effectiveness analysis could travel, namely, 'methodological and theoretical hybridity'. Firstly, the study points to the benefit of greater 'methodological hybridity' By employing multi-criteria analysis and multi-level analysis through AHP type methodologies that were originally developed outside the field of regime analysis, this study offered new insights into effectiveness analysis.

It is through this method that inputs were decomposed to problem and process factors that were further decomposed to their subobjectives or generic elements. After the decomposition, physical causal and causal proximity methods were employed for cause-and-effect analysis. The physical causal reasoning worked well in the identification of subobjectives and in identification of the most important causes of effects. The causal proximity method added value to the *modus operandi method* by scoring the causal distances of the multiple causes, especially in regime impacts and effectiveness analysis. Secondly, in relation to theoretical hybridity neoliberal institutionalism theory is predominant in regime effectiveness, but other theories should not be ignored. In a third world context, realism, constructivism and structuralism constitute competing but potentially complementary.

This study has suggested many new insights into the analysis of transboundary water regimes effectiveness that can also be employed in the analysis of global environmental and natural resources regimes. However, its focus was limited to exploring a single case study. The RALP model, never been used before, has just been developed and requires further

applications on a wider scale and across scales. As such, this approach of regime analysis needs to tested or piloted and probably improved to offer prescriptions to governance systems. Research schemes could explore more within-case studies and/or comparative analyses of effectiveness as suggested below.

Shared water worldwide is experiencing many challenges and some scholars have indicated that the next world war could be fought over water. The urgent agenda is to find ways of not just governing shared water sustainably, but also equitably. As such, this study has suggested a 'norm-shift' from benefit maximization to 'maximization of 'duty of care' for human survival through observing fundamental values. As such, furthering this study would shed light on how the donor agencies, mainly the North would package its aid to consider moral values. Also, through the RALP model, the study has shown how current donor effort can be socialized to internalize substantive characteristics, through strategic action planning that would prescribe solutions to current regime systems. This study has also shown how donor agencies need to reform their operational directives from promoting procedural concerns to balance with substantive characteristics. It has offered a tool to pursue new horizons to shed light on prescriptive measures in many such problems.

The aspect of effectiveness analysis has been equated with impact analysis or assessment in many environmental and natural resources studies. While the discipline of impact assessment has reached the level of being subject matter, effectiveness analysis studies are rare. While many scholars have considered strategic environmental assessments as complementary to environmental impact assessments, this study has shown how different effectiveness analysis is from the two by showing prescriptive targets. As such, effectiveness analysis has wider application from local level to country level, and eventually international level. For example,

many governments have many ministries that directly or indirectly relate to environmental issues, however how effectively each ministry contributes to attain the goal of environmental sustainability remains to be studied.

At the international level, interventions are packaged for states to implement to attain global governance. However, how much effect each package contributes to global governance is yet to be analyzed. For example, the climate regime is suffering from lack recognition of its moral value. Actors are so much tied to economic interests and sovereignty than furtherance of human survival through recognition of fundamental values. Similarly, many river and lake basins are suffering from degradation due to self-interests and sovereignty. The Nile Basin (in North Eastern Africa), The Great Rift Valley Lakes (of Eastern Africa), the shared coastal zones of the world, amongst many other shared waters in the world form areas that can directly benefit from this type of research.

This study has also shown how research in understanding regime architecture from regime inputs is relevant if we want to reform transboundary water governance. The findings identified limitation in understanding regime architecture as derived from regime creation processes. Many regimes have employed a 'jettisoning approach' of regime architecture from global conventions.

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APPENDICES

APPENDIX 1

AFRICAN CONVENTION ON THE CONSERVATION OF NATURE AND NATURAL RESOURCES (ACCNNR)

Adopted in Algiers, Algeria, on 15 September 1968, and entered into force on 16 June 1969. OAU reference unknown. Also reprinted in Gino J Naldi (ed) Documents of the Organization of African Unity (1992) 65

PREAMBLE

We, the Heads of State and Government of independent African states,

Fully conscious that soil, water, flora and faunal resources constitute a capital of vital importance to mankind;

Confirming, as we accepted upon declaring our adherence to the Charter of the Organization of African Unity, that we know that it is our duty "to harness the natural and human resources of our continent for the total advancement of our peoples in spheres of human endeavour";

Fully conscious of the ever-growing importance of natural resources from an economic, nutritional, scientific, educational, cultural and aesthetic point of view;

Conscious of the dangers which threaten some of these irreplaceable assets;

Accepting that the utilisation of the natural resources must aim at satisfying the needs of man according to the carrying capacity of the environment;

Desirous of undertaking individual and joint action for the conservation, utilisation and development of these assets by establishing and maintaining their rational utilisation for the present and future welfare of mankind;

Convinced that one of the most appropriate means of achieving this end is to bring into force a convention:

HAVE AGREED AS FOLLOWS:

Article I
The contracting states hereby establish an African Convention on the Conservation of Nature and Natural Resources.

Article II: Fundamental principle

The contracting states shall undertake to adopt the measures necessary to ensure conservation, utilisation and development of soil, water, flora and faunal resources in accordance with scientific principles and with due regard to the best interests of the people.

Article III: Definitions

For purposes of the present Convention, the meaning of the following expressions shall be as defined below:

1. "Natural Resources" means renewable resources, that is soil, water, flora and fauna.
2. "Specimen" means an individual example of a species of wild animal or wild plant or part of a wild plant.
3. "Trophy" means any dead animal specimen or part thereof whether included in a manufactured or processed object or otherwise dealt with, unless it has lost its original identity; also nests, eggs and eggshells.
4. "Conservation area" means any protected natural resource area, whether it be a strict natural reserve, a national park or a special reserve;

a) "Strict nature reserve" means an area:

1) under state control and the boundaries of which may not be altered nor any portion alienated except by the competent legislative authority,

2) throughout which any form of hunting or fishing, any undertaking connected with forestry, agriculture or mining, any grazing, any excavation or prospecting, drilling, levelling of the ground or construction, any work tending to alter the configuration of the soil or the character of the vegetation, any water pollution and generally, any act likely to harm or disturb the fauna or flora, including introduction of zoological or botanical species, whether indigenous or imported, wild or domesticated, are strictly forbidden,

3) where it shall be forbidden to reside, enter, traverse or camp, and where it shall be forbidden to fly over at low altitude, without a special written permit from the competent authority, and in which scientific investigations (including removal of animals and plants in order to maintain an ecosystem) may only be undertaken by permission of the competent authority;

b) "national park" means an area:

1) under state control and the boundaries of which may not be altered or any portion alienated except by the competent legislative authority,

2) exclusively set aside for the propagation, protection, conservation and management of vegetation and wild animals as well as for the protection of sites, landscapes or geological formations of particular scientific or aesthetic value, for the benefit and enjoyment of the general public, and

3) in which the killing, hunting and capture of animals and the destruction or collection of plants are prohibited except for scientific and management purposes and on the

condition that such measures are taken under the direction or control of the competent authority,

4) covering any aquatic environment to which all of the provision of section (b) (1-3) above are applicable.

The activities prohibited in strict nature reserves under the provisions of section (a) (2) of paragraph (4) of this article are equally prohibited in national parks except in so far as they are necessary to enable the park authorities to implement the provisions of section (2) of this paragraph, by applying, for example, appropriate management practices, and to enable the public to visit these parks; however, sport fishing may be practiced with the authorisation and under the control of the competent authority.

c) "special reserve" means other protected areas such as:

1) "game reserve" which shall denote an area:

a) set aside for the conservation, management and propagation of wild animal life and the protection and management of its habitat,

b) within which the hunting, killing or capture of fauna shall be prohibited except by or under the direction or control of the reserve authorities,

c) where settlement and other human activities shall be controlled or prohibited,

2) "partial reserve" or "sanctuary" which shall denote an area:

a) set aside to protect characteristic wildlife and especially bird communities, or to protect particularly threatened animal or plant species and especially those listed in the Annex to this Convention, together with the biotopes essential for their survival,

b) in which all other interests and activities shall be subordinated to this end,

3) "soil", "water" or "forest" reserve shall denote areas set aside to protect such resources.

Article IV: Soil

The contracting states shall take effective measures for conservation and improvement of the soil and shall in particular combat erosion and misuse of the soil. To this end:

a) they shall establish land-use plans based on scientific investigations (ecological, pedagogical, economic, and sociological) and, in particular, classification of land use capability.

b) they shall, when implementing agricultural practices and agrarian reforms,

1) improve soil-conservation and introduce improved farming methods, which ensure long-term productivity of the land,

2) control erosion caused by various forms of land-use which may lead to loss of vegetation cover.

Article V: Water

1. The contracting states shall establish policies for conservation, utilisation and development of underground and surface water, and shall endeavour to guarantee for their populations a sufficient and continuous supply of suitable water, taking appropriate measures with due regard to:

1) the study of water cycles and the investigation of each catchment area,

2) the co-ordination and planning of water resources development projects,

3) the administration and control of all water utilisation, and

4) prevention and control of water pollution.

2. Where surface or underground water resources are shared by two or more of the contracting states, the latter shall act in consultation, and if the need arises, set up inter-state commissions to study and resolve problems arising from the joint use of these resources, and for the joint development and conservation thereof.

Article VI: Flora

1. The contracting states shall take all necessary measures for the protection of flora and to ensure its best utilisation and development. To this end the contracting states shall:

a) adopt scientifically-based conservation, utilisation and management plans of forests and rangeland, taking into account the social and economic needs of the states concerned, the importance of the vegetation cover for the maintenance of the water balance of an area, the productivity of soils and the habitat requirements of the fauna;

b) observe section (a) above by paying particular attention to controlling bush fires, forest exploitation, land clearing for cultivation, and over-grazing by domestic and wild animals;

c) set aside areas for forest reserves and carry out aforestation programmes where necessary;

d) limit forest grazing to seasons and intensities that will not prevent forest regeneration; and

e) establish botanical gardens to perpetuate plant species of particular interest.

2. The contracting states also shall undertake the conservation of plant species or communities, which are threatened and/or of special scientific or aesthetic value by ensuring that they are included in conservation areas.

Article VII: Faunal resources

1. The contracting states shall ensure conservation, wise use and development of faunal resources and their environment, within the framework of land-use planning and of economic and social development. Management shall be carried out in accordance with plans based on scientific principles, and to that end the contracting states shall:

a) manage wildlife populations inside designated areas according to the objectives of such areas and also manage exploitable wildlife populations outside such areas for an optimum sustained yield, compatible with and complementary to other land uses; and

b) manage aquatic environments, whether in fresh, brackish or coastal water, with a view to minimise deleterious effects of any water and land use practice which might adversely affect aquatic habitats.

2. The contracting states shall adopt adequate legislation on hunting, capture and fishing, under which:

a) the issue of permits is properly regulated;

b) unauthorised methods are prohibited;

c) the following methods of hunting, capture and fishing are prohibited:

   1) any method liable to cause a mass destruction of wild animals,

   2) the use of drugs, poisons, poisoned weapons or poisoned baits,

   3) the use of explosives,

   4) the following methods of hunting and capture are particularly prohibited:

      1. the use of mechanically propelled vehicles,

      2. the use of fire,

      3. the use of fire arms capable of firing more than one round at each pull of the trigger,

      4. hunting or capture at nights,

      5. the use of missiles containing detonators;

d) the following methods of hunting or capture are as far as possible prohibited:

   1) the use of nets and stockades,

   2) the use of concealed traps, pits, snares, set-gun traps, deadfalls, and hunting from a blind or hide;

e) with a view to as rational use as possible of game meat the abandonment by hunters of carcasses of animals, which represent a food resource, is prohibited.

Capture of animals with the aid of drugs or mechanically-propelled vehicles, or hunting or capture by night if carried out by, or under the control of, the competent authority shall nevertheless be exempted from the prohibitions under (c) above.

Article VIII: Protected species

1. The contracting states recognise that it is important and urgent to accord a special protection to those animal and plant species that are threatened with extinction, or which may become so, and to the habitat necessary to their survival. Where such a species is represented only in the territory of one contracting state, that state has a particular responsibility for its protection. These species which are, or may be listed, according to the degree of protection that shall be given to them are placed in Class A of B of the annex to this Convention, and shall be protected by contracting states as follows:
    1) species in Class A shall be totally protected throughout the entire territory of the contracting states; the hunting, killing, capture or collection of specimens shall be permitted only on the authorisation in each case of the highest competent authority and only if required in the national interest or for scientific purposes; and
    2) species in Class B shall be totally protected, but may be hunted, killed, captured or collected under special authorisation granted by the competent authority.
2. The competent authority of each contracting state shall examine the necessity of applying the provisions of this article to species listed in the annex, in order to conserve the indigenous flora and fauna of their respective countries. Such additional species shall be placed in Class A or B by the state concerned, according to its specific requirements.

Article IX: Traffic in specimens and trophies

1. In the case of animal species to which article VIII does not apply the contracting states shall:

a) regulate trade in and transport of specimens and trophies;

b) control the application of these regulations in such a way as to prevent trade in specimens and trophies which have been illegally captured or killed or obtained.

2. In the case of plant and animal species to which article VIII paragraph (1) applies, the contracting state shall:
    a) take all measures similar to those in paragraph (1);
    b) make the export of such specimens and trophies subject to an authorisation:
    1) additional to that required for their capture, killing or collection by article VIII,

    2) which indicates their destination,

    3) which shall not be given unless the specimens or trophies have been obtained legally,

    4) which shall be examined prior to exportation,

    5) which shall be on a standard form, as may be arranged under article XVI;
    c) make the import and transit of such specimens and trophies subject to the presentation of the authorisation required under section (b) above, with due provision for the confiscation of specimens and trophies exported illegally, without prejudice to the application of other penalties.

Article X: Conservation areas

1. The contracting states shall maintain and extend where appropriate, within their territory and where applicable in their territorial waters, the conservation areas existing at the time of entry into force of the present Convention and, preferably within the framework of land-use planning programmes, assess the necessity of establishing additional conservation areas in order to:

a) protect those ecosystems which are most representative of and particularly those which are in any respect peculiar to their territories;

b) ensure conservation of all species and more particularly of those listed or may be listed in the annex to this Convention.

2. The contracting states shall establish where necessary, around the borders of conservation areas, zones within which the competent authorities shall control activities detrimental to the protected natural resources.

Article XI: Customary rights

The contracting states shall take all necessary legislative measures to reconcile customary rights with the provisions of this Convention.

Article XII: Research

The contracting states shall encourage and promote research in conservation, utilisation and management of natural resources and shall pay particular attention to ecological and sociological factors.

Article XIII: Conservation education

1. a) The contracting states shall ensure that their peoples appreciate their close dependence on natural resources and that they understand the need, and rules for, the rational utilisation of these resources.

b) For this purpose they shall ensure that the principles indicated in paragraph (1):

   1) are included in educational programmes at all levels,

   2) form the object of information campaigns capable of acquainting the public with, and winning it over to, the idea of conservation.

2. In order to put into effect paragraph (1) above, the contracting states shall make maximum use of the educational value of conservation areas.

Article XIV: Development plans

1. The contracting states shall ensure that conservation and management of natural resources are treated as an integral part of national and/or regional development plans.
2. In the formulation of all developments plans, full consideration shall be given to ecological, as well as to economic and social factors.
3. Where any development plan is likely to affect the natural resources of another state, the latter shall be consulted.

Article XV: Organisation of national conservation services

Each contracting state shall establish, if it has not already done so, a single agency empowered to deal with all matters covered by this Convention, but, where this is not possible a co-ordinating machinery shall be established for this purpose.

Article XVI: Inter-state co-operation

1. The contracting states shall co-operate:

a) whenever such co-operation is necessary to give effect to the provisions of this Convention, and

b) whenever any national measure is likely to affect the natural resources of any other state.

2. The contracting states shall supply the Organization of African Unity with:

a) the text of laws, decrees, regulations and instructions in force in their territories, which are intended to ensure the implementation of this Convention,

b) reports on the results achieved in applying the provisions of this Convention, and

c) all the information necessary for the complete documentation of matters dealt with by this Convention if requested.

3. If so requested by contracting states, the Organization of African Unity shall organise any meeting which may be necessary to dispose of any matters covered by this Convention. Requests for such meetings must be made by at least three of the contracting states and be approved by two thirds of the states which it is proposed should participate in such meetings.

4. Any expenditure arising from this Convention, which devolves upon the Organization of African Unity shall be included in its regular budget, unless shared by the contracting states or otherwise defrayed.

Article XVII: Provision for exceptions

1. The provisions of this Convention shall not affect the responsibilities of contracting states concerning:

a) the paramount interest of the state,

b) *force majeure*,

c) defence of human life.

2. The provisions of this Convention shall not prevent contracting states:

a) in time of famine,

b) for the protection of public health,

c) in defence of property,

to enact measures contrary to the provisions of the Convention, provided their application is precisely defined in respect of aim, time and place.

Article XVIII: Settlement of disputes

Any dispute between the contracting states relating to the interpretation or application of this Convention which cannot be settled by negotiation, shall at the request of any party be submitted to the Commission of Mediation, Conciliation and Arbitration of the Organization of African Unity.

Article XIX: Signature and ratification

1. This Convention shall be open for signature immediately after being approved by the Assembly of Heads of State and Government of the Organization of African Unity.
2. This Convention shall be ratified by each of the contracting states. The instruments of ratification shall be deposited with the Administrative Secretary-General of the Organization of African Unity.

Article XX: Reservations

1. At the time of signature, ratification or accession any state may declare its acceptance of this Convention in part only, provided that such reservation may not apply to the provisions of articles II - XI.
2. Reservations made in conformity with the preceding paragraph shall be deposited together with the instruments of ratification or accession.
3. Any contracting state which has formulated a reservation in conformity with the preceding paragraph may at any time withdraw it by notifying the Administrative Secretary-General of the Organization of African Unity.

Article XXI: Entry into force

1. This Convention shall come into force on the thirtieth day following the date of deposit of the fourth instrument of ratification or accession with the Administrative Secretary-General of the Organization of African Unity, who shall inform participating states accordingly.
2. In the case of a state ratifying or acceding to the Convention after the depositing of the fourth instrument of ratification or accession, the Convention shall come into force on the thirtieth day after the deposit by such state of its instrument of ratification or accession.
3. The London Convention of 1933 or any other Convention on the conservation of flora and fauna in their natural state shall cease to have effect in states in which this Convention has come into force.

Article XXII: Accession

1. After the date of approval specified in article XIX, paragraph (1), this Convention shall be open to accession by any independent and sovereign African state.
2. The instruments of accession shall be deposited with the Administrative Secretary-General of the Organization of African Unity.

Article XXIII: Denunciation

1. Any contracting state may denounce this Convention by notification in writing addressed to the Administrative Secretary-General of the Organization of African Unity.

2. Such denunciation shall take effect, for such a state, one year after the date of receipt of its notification by the Administrative Secretary-General of the Organization of African Unity.
3. No denunciation shall, however, be made before the expiry of a period of five years from the date at which for the state concerned this Convention comes into force.

Article XXIV: Revision

1. After the expiry of a period of five years from the date of entry into force of this Convention, any contracting state may at any time make a request for the revision of part or the whole of this Convention by notification in writing addressed to the Administrative Secretary-General of the Organization of African Unity.
2. In the event of such a request the appropriate organ of the Organization of African Unity shall deal with the matter in accordance with the provision of sections 3 and 4 of article XVI of this Convention.

3. (i) At the request of one or more contracting states and notwithstanding the provisions of paragraphs (1) and (2) of this article, the annex to this Convention may be revised or added to by the appropriate organ of the Organization of African Unity.

(ii) Such revision or addition shall come into force three months after the approval by the appropriate organ of the Organization of African Unity.

Article XXV: Final provisions

The original of this Convention of which both the English and the French texts are authentic, shall be deposited with the Administrative Secretary-General of the Organization of African Unity.

...

APPENDIX 2

AGREEMENT ON THE PREPARATION OF A TRIPARTITE ENVIRONMENTAL MANAGEMENT PROGRAMME FOR LAKE VICTORIA (APTEMAP)

Adopted at Arusha on 5 August 1994

The Contracting Parties

The Governments of the Republic of Kenya, the United Republic of Tanzania and the Republic of Uganda, referred to below as the Parties;

Recognizing the efforts made by the three States to strengthen regional co-operation in the spirit of the Agreement for the Establishment of a Permanent Tripartite Commission for the Co-operation among them signed in Arusha on 30th November 1993;

Aware of the environmental importance of Lake Victoria and its significance to the sustainable development of the three riparian countries;

Concerned that the present level of exploitation of the fisheries resources of Lake Victoria may be close to the limits of the sustainable yield of the lake fishery;

Further concerned that increased agricultural and urban run-off, discharge of domestic and industrial waste into Lake Victoria adversely affects the ecological system of the Lake;

Recognizing that the conversion of wetland areas around Lake Victoria for agricultural and/or other uses may have a detrimental effect on the lake ecosystem;

Noting that significant changes have occurred as regards fish stocks within Lake Victoria with some of the indigenous species facing depletion;

Agreeing that regional co-operation is an essential component of the environmental management of the Lake, and being in the process of establishing the Lake Victoria Fisheries Organization to jointly manage the fishery resources of the Lake;

Recognizing that poverty is both a cause and a consequence of environmental degradation and must therefore be addressed adequately in order to enhance equitable and sustainable development among riparian communities;

Desirous to maximize the benefits accruing to the riparian countries from integrated and sustainable utilization of Lake Victoria resources and the conservation of a global natural heritage;

Recognizing that integrated management of the various resources which constitute the lake environment, is essential;

Accepting that the environmental management of Lake Victoria will require a sustained long-term effort based on a comprehensive programme addressing the various problems; and to this end requires national capacity building by using and strengthening existing institutions

to conduct on a sustainable basis ongoing and additional functions under a regional programme.

Have agreed as follows

Article 1

Components and tasks

1. The Parties agree to initiate and implement a five-year programme to strengthen regional co-ordination in the management of Lake Victoria resources, including fisheries, water, and other resources as set out in Attachment 1 [not reproduced].

2. The preparation of the programme shall follow the action plan as presented in Attachment 5 [not reproduced].

Article 2

Organizational arrangements

1. The Parties shall establish a Regional Policy and Steering Committee, to be assisted by a Regional Secretariat, and two Regional Task Forces with Terms of Reference as specified in Attachment 2 [not reproduced].

a) The Regional Policy and Steering Committee shall be headed by a Chairperson to be elected by that Committee from among its membership at its first meeting and thereafter on an annual rotation, and shall include a maximum of three representatives of each Party led by an officer at permanent secretary level. The Executive Secretary, to be appointed by the Regional Policy and Steering Committee, at its first meeting, shall as head of the Regional Secretariat be responsible for monitoring progress, preparing review meetings, and compiling the preparation report.

b) One regional task force shall address fisheries management, and control of water hyacinth and other invasive weeds (Regional Task Force 1). The Lake Victoria Sub-Committee of the Committee on Inland Fisheries in Africa (CIFA) would undertake these functions. Once established, the Executive Committee of the proposed Lake Victoria Fisheries Organization would assume these functions from the CIFA Sub-committee.

c) Another regional task force shall address management of water quality and land use, including wetlands (Regional Task Force 2).

2. The regional task forces shall be composed of members from national working groups as established by the Parties.

3. The Executive Secretary, referred to under paragraph 1(a) above, with the approval of the Policy and Steering Committee, shall make the necessary arrangements for recruitment of staff, experts, and other personnel to assist the Regional Task Forces in performing their functions. The experts recruited shall include, but not be limited to, the list of expertise contained in Attachment 3 [not reproduced] and the terms and conditions of service for the

members of staff shall be in accordance with the guidelines set out by the Regional Policy and Steering Committee.

4. Each Party shall establish two National Working Groups and a National Secretariat to prepare national proposals for incorporation into regional programme components.

a) The two National Working Groups shall prepare national proposals for regional actions in respect of (i) fisheries management and control of water hyacinth and other invasive weeds,
and (ii) management of water quality and land use, including wetlands. The membership shall include both administrative and scientific personnel, academic institutions, private sector parties and local non-governmental organizations, with a special effort to be made to incorporate local riparian community interests.

b) The National Secretariat in each country shall lend logistical support to the national working groups, integrate the findings of the working groups and prepare national documents for the regional deliberations. The heads of the national secretariats shall assist the Executive Secretary of the Regional Secretariat in preparing regional meetings and compiling the regional preparation report. The location of national secretariats in each country shall be determined by the Government.

5. The relationship between the organizational units established pursuant to Article 2 herein above shall be in accordance with Attachment 2, page 3 [not reproduced].

Article 3

Lead responsibilities

1. The lead responsibilities shall be distributed as follows: the Republic of Kenya shall be responsible for Regional Task Force 2 on Water Quality and Land Use, including Wetlands; the United Republic of Tanzania shall be responsible for the Regional Secretariat serving the Regional Policy Steering Committee; and the Republic of Uganda shall be responsible for Regional Task Force 1 on Fisheries Management and Control of Water Hyacinth and other Invasive Weeds.

Article 4

Financial Arrangements

1. An estimate of the overall costs for programme preparation broken down by organizational entities is given in Attachment 4 [not reproduced]. The Parties shall establish mechanisms to (i) access and (ii) manage the financial resources required to implement the preparatory programme.

Article 5

Final clauses

1. This Agreement shall enter into force on the date of tripartite signature thereof.

2. The Parties may adopt any amendment to this Agreement by mutual consent in writing.

3. The Secretary-General of the United Nations shall assume the functions of Depositary of this Agreement and any subsequent agreement reached by the Parties hereto pursuant to this agreement.

In Witness Whereof the undersigned, being duly authorized to that effect, have signed the Agreement this 5th day of August The Year One Thousand Nine Hundred and Ninety-Four.

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APPENDIX 3

THE TREATY FOR THE ESTABLISHMENT OF THE EAST AFRICAN COMMUNITY

Signed on November 30th, 1999
Entered into force on July 7th, 2000

CHAPTER NINETEEN
CO-OPERATION IN ENVIRONMENT AND NATURAL RESOURCES MANAGEMENT

ARTICLE 111

Environmental Issues and Natural Resources

1.The Partner States recognise that development activities may have negative impacts on the environment leading to the degradation of the environment and depletion of natural resources and that a clean and healthy environment is a prerequisite for sustainable development. The Partner States therefore:

(a) agree to take concerted measures to foster co-operation in the joint and efficient management and sustainable utilisation of natural resources within the Community;

(b) undertake, through environmental management strategy, to co-operate and coordinate their policies and actions for the protection and conservation of the natural resources and environment against all forms of degradation and pollution arising from developmental activities;

(c) undertake to co-operate and adopt common policies for control of trans-boundary movement of toxic and hazardous waste including nuclear materials and any other undesirable materials;

(d) shall provide prior and timely notification and relevant information to each other on natural and human activities that may or are likely to have significant transboundary environmental impacts and shall consult with each other at an early
stage; and

(e) shall develop and promote capacity building programmes for sustainable management of natural resources.

2. Action by the Community relating to the environment shall have the following objectives:
(a) to preserve, protect and enhance the quality of the environment;
(b) to contribute towards the sustainability of the environment;
(c) to ensure sustainable utilization of natural resources like lakes, wetlands, forests
and other aquatic and terrestrial ecosystems; and
(d) to jointly develop and adopt water resources conservation and management
policies that ensure sustenance and preservation of ecosystems.

ARTICLE 112

Management of the Environment

1. For purposes of Article 111 of this Treaty, the Partner States undertake to cooperate in the management of the environment and agree to:

(a) develop a common environmental management policy that would sustain the ecosystems of the Partner States, prevent, arrest and reverse the effects of environmental degradation;

(b) develop special environmental management strategies to manage fragile ecosystems, terrestrial and marine resources, noxious emissions and toxic and hazardous chemicals;

(c) take measures to control trans-boundary air, land and water pollution arising from developmental activities;

(d) take necessary disaster preparedness, management, protection and mitigation measures especially for the control of natural and man-made disasters. These include oil spills, bio-hazards, floods, earthquakes, marine accidents, drought and bush fires; and (e) integrate environmental management and conservation measures in all developmental activities such as trade, transport, agriculture, industrial development, mining and tourism in the Community.

2. For purposes of paragraph 1 of this Article, the Partner States undertake to:

(a) adopt common environment control regulations, incentives and standards;

(b) develop capabilities and measures to undertake environmental impact assessment of all development project activities and programmes;

(c) encourage the manufacture and use of bio-degradable pesticides, herbicides and packaging materials;

(d) encourage public awareness and education on the use of agricultural and industrial chemicals and fertilisers;

(e) adopt environmentally sound management techniques for the control of land degradation, such as soil erosion, desertification and forest encroachment;

(f) promote the use of non-ozone depleting susbstances and environment-friendly technologies;

(g) promote and strengthen the utilisation of training facilities and research institutions within the Community;

(h) adopt common environmental standards for the control of atmospheric, terrestrial and water pollution arising from urban and industrial development activities;

(i) exchange information on atmospheric, industrial and other forms of pollution and conservation technology;

(j) harmonise their policies and regulations for the sustainable and integrated management of shared natural resources and ecosystems;

(k) adopt measures and policies to address the existing demographic profiles such as high growth rates and fertility rates, high dependency ratio, poor social conditions and poverty in order to mitigate their adverse impact on the environment and development;

(l) adopt community environmental management programmes;

(m) promote enhancement of the quality of the environment through adoption of common measures and programmes of tree planting, afforestation and reforestation, soil conservation and recycling of materials; and

(n) adopt common policies for conservation of biodiversity and common regulations for access to, management and equitable utilisation of genetic resources.

ARTICLE 113

Prevention of illegal Trade in and Movement of Toxic Chemicals, Substances and Hazardous Wastes

1. The Partner States undertake to co-operate and adopt common positions against illegal dumping of toxic chemicals, substances and hazardous wastes within the Community from either a Partner State or any third party.

2. The Partner States shall harmonise their legal and regulatory framework for the management, movement, utilisation and disposal of toxic substances.

3. The Partner States undertake to ratify or accede to international environmental conventions that are designed to improve environmental policies and management.

ARTICLE 114

Management of Natural Resources

1. For purposes of Article 111 of this Treaty, the Partner States agree to take concerted measures to foster co-operation in the joint and efficient management and the sustainable utilisation of natural resources within the Community for the mutual benefit of the Partner States. In particular, the Partner States shall:

   (a) take necessary measures to conserve their natural resources;

(b) co-operate in the management of their natural resources for the conservation of the eco-systems and the arrest of environmental degradation; and

(c) adopt common regulations for the protection of shared aquatic and terrestrial resources.

2. For purposes of paragraph 1 of this Article, the Partner States:

a) with regard to the conservation and management of forests, agree to take necessary measures through:

i. the adoption of common policies for, and the exchange of information on, the development, conservation and management of natural forests, commercial plantations and natural reserves;

ii. the joint promotion of common forestry practices within the Community;

iii. the joint utilisation of forestry training and research facilities;

iv. the adoption of common regulations conservation and management of all catchment forests within the Community;

v. the establishment of uniform regulations for the utilisation of forestry resources in order to reduce the depletion of natural forests and avoid desertification within the Community; and

vi. the establishment of Api-Agro Forestry Systems.

b) with regard to the management of their water and marine resources, agree to co-operate through:

i. the establishment and adoption of common regulations for the better management and development of marine parks, reserves, wetlands and controlled areas;

ii. the adoption of common policies and regulations for the conservation, management and development of fisheries resources;

iii. the establishment of common fisheries management and investment guidelines for inland and marine waters;

iv. the strengthening of regional natural resources management bodies;

v. the establishment of common rules of origin for flora and fauna; and

vi. the establishment of a body for the management of Lake Victoria;

c) with regard to the management of the mineral resources sector, agree:

(i) to promote joint exploration, efficient exploitation and sustainable utilisation of shared mineral resources;

(ii) to pursue the creation of an enabling environment for investment in the mining sector;

(iii) to promote the establishment of databases, information exchange networks and the sharing of experiences in the management and development of the mineral sector using electronic mail, Internet and other means for the interactive dissemination of mineral information;

(iv) to harmonise mining regulations to ensure environmentally friendly and sound mining practices;

(v) to adopt common policies to ensure joint fossil exploration and exploitation along the coast and rift valley; and

(vi) to establish a regional seismological network whose primary objective is to monitor seismicity and advice on mitigation measures.

APPENDIX 4

PROTOCOL FOR SUSTAINABLE DEVELOPMENT OF LAKE VICTORIA BASIN (LV Protocol)

SIGNED ON 29TH NOVEMBER 2003
EAST AFRICAN COMMUNITY

PREAMBLE

WHEREAS the Republic of Kenya, Republic of Uganda and the United Republic of Tanzania (hereinafter referred to as the Partner States) enjoy close historical, commercial, industrial, cultural and other ties and have signed a Treaty for the Establishment of the East African Community on 30th November 1999;

RECOGNISING the need for increased investment in the field of energy, transport, communications, infrastructure, tourism, agriculture, fisheries, livestock, forestry, mining and other areas of social and economic endeavour to spur development and eradicate poverty in the Lake Victoria Basin;

AND WHEREAS the Partner States recognize in the Treaty that development activities may have negative impacts on the environment leading to degradation of the environment and depletion of natural resources and that a clean and healthy environment is prerequisite for sustainable development;

RECOGNISING that water is a finite and vulnerable resource essential to sustain life, development and the environment and must be managed in an integrated and holistic manner, linking social and economic development with protection and conservation of natural ecosystems;

RECOGNISING that water is an economic good having social and economic value, whose utilization should give priority to most economic use taking cognizance of basic human needs and the safeguarding of ecosystems;

RECIGBUSING FURTHER that the Treaty obliges the Partner States to cooperate in relation to Lake Victoria Basin in a co-ordinated and sustainable manner and that the Partner States have agreed to negotiate as a bloc on issues relating to the basin;

RECOGNISING the need to develop and implement measures to enhance safety of life, navigation and preservation of aquatic environment of the Lake Victoria Basin; and AWARE that Partner States have designated the Lake Victoria Basin as an economic growth zone, established a Sectoral Council and agreed to establish a body for the management of Lake Victoria;

NOW THEREFORE, the Partner States determined to address issues to sustainable development of Lake Victoria Basin;

“AGREE AS FOLLOWS”
ARTICLE 1

Definitions

1) Unless the context otherwise requires, the terms used in this Protocol shall have the same meaning as ascribed to them in the Treaty for the Establishment of the East African Community.

2) Without prejudice to paragraph 1 of this Article: "Basin" means the Lake Victoria Basin; "Commission" means the Lake Victoria Basin Commission established under Article 33 of this Protocol.

"Community" means the East African Community established under the Treaty for the Establishment of the East African Community signed at Arusha on 30th November, 1999;

"Council" means the Council of Ministers of the East African Community;

"Emergency" means a situation that causes or poses an imminent threat of causing serious harm to a Partner State or other States and that results suddenly from natural causes, such as floods, droughts, landslides or earthquakes, or from human conduct, such as industrial accidents or inland water transport accidents;

"Lake" means Lake Victoria;

"Lake Victoria Basin" means that geographical areas extending within the territories of the Partner States determined by the watershed limits of the system of waters, including surface and underground waters flowing into Lake Victoria;

"Navigation" means a nautical art or science of conducting a vessel from one place to another;

"Nile River Basin" means that geographical areas extending across the territories of various States drained by the River Nile and its tributaries
and determined by the watershed limits of the system of waters, including surface and underground waters flowing into the river Nile system and eventually into the Mediterranean Sea;

"Partner States" means parties to the Treaty for the Establishment of the East African Community namely, the Republic of Kenya, the Republic of Uganda and the United Republic of Tanzania;

"Partnership Agreement" means the agreement signed between the East African Community and the Development Partners interested in promoting sustainable development of Lake Victoria Basin signed on 24th April 2001;

"Secretary General" means the Secretary General of the East African Community;

"Secretariat" means the Secretariat of the East African Community;

"Stakeholder" means all persons, legal or natural and all other entities being governmental or non-governmental, residing, having interest or conduction business in the Basin;

"Sustainable Development" means development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs;

"Sustainable Utilization" means use of resources by present generation, which does not impair the right of future generations to use the same to meet their needs;

"Treaty" means the Treaty for the Establishment of the East African Community signed at Arusha on 30th November 1999;

"Water Resources" means all forms of water on the surface and in the ground including the living and non-living resources therein.

ARTICLE 2
Application of the Protocol

This Protocol shall govern the Partner States Cooperation in the Sustainable Development of Lake Victoria Basin.

ARTICLE 3
Scope of Co-operation

The Partner States have agreed to cooperate in the areas as they relate to the conservation and sustainable utilization of the resources of the Basin including the following:

a. Sustainable development, management and equitable utilization of water resources;

b. Sustainable development and management of fisheries resources;

c. Promotion of sustainable agricultural and land use practices including irrigation;

d. Promotion of sustainable development and management of forestry resources;

e. Promotion of development and management of westlands;

f. Promotion of trade, commerce and industrial development;

g. Promotion of development of infrastructure and energy;

h. Maintenance of navigational safety and maritime security;

i. Improvement in public health with specific reference to sanitation;

j. Promotion of research, capacity building and information exchange;

k. Environmental protection and management of the Basin'

l. Promotion of Public participation in planning and decision-making;

m. Integration of gender concerns in all activities in the Basin; and

n. Promotion of wildlife conservation and sustainable tourism development.

ARTICLE 4
Principles

1. The Partner States shall manage the resources of the Basin in accordance with the principles set out in Articles, 5, 6, 7 and 8 and other provisions of the Treaty.

2. Without prejudice to the generality of 1 of this Article, the management of the resources of the Basin shall be guided by the following principles:

a. The principle of equitable and reasonable utilization of water resources;

b. The principle of sustainable development;

c. The principle of prevention to cause harm to members whereby Partner States shall individually and jointly take all appropriate measures to prevent environmental harm rather than attempting to repair it after it has occurred;

d. The Principle of prior notification concerning Planned measures whereby each of the Partner States shall notify other Partner States of planned activities within its territory that may have adverse affects upon those other States;

e. The principle of Environment Impact Assessment and Audit'

f. The precautionary principle whereby each Partner State shall take the necessary measures to prevent environmental degradation from threats of serious or irreversible harm to the environment, despite lack of full scientific certainty regarding the nature and extent of the threat;

g. The 'pollute pays' principle whereby the person that causes the pollution shall as far as possible bear any costs associated with its;

h. The Principle of public participation whereby decisions about a project or policy take into account the views of the stakeholders;

i. The Principle of prevention, minimization and control of pollution of watercourses so as to minimize adverse effects on fresh water resources and their ecosystems including fish and other aquatic species and on human health;

j. The principle of the protection and preservation of the ecosystems of international watercourses whereby ecosystems are treated as units, all of whose components are necessary to their proper functioning and that they be protected and preserved to the extent possible;

k. The principle of community of interests in an international water course whereby all States sharing an international watercourse system have an interest in the unitary whole of the system;

l. The principle of gender equality in development and decision-making;

m. The principle that water is a social and economic good and a finite resource; and

n. The principle of subsidiary.

ARTICLE 5
EQUITABLE AND REASONABLE UTILISATION OF WATER RESOURCES

The Partner States shall utilize the water resources of the Basin, in their respective territories in an equitable and reasonable manner.

1. The water resources shall be used and developed by Partner States with a view to attaining optimal and sustainable utilization and benefits there from, taking into account the interests of the Partner States;
2. Each Partner State is entitled to an equitable and reasonable share in the beneficial uses of the water resources of the Basin consistent with the principles enumerated in Article of this Protocol.
3. In ensuring that the utilization of the Basin water resource is equitable and reasonable, the Partner States shall take into account all relevant factors and circumstances, including but not limited to the following:-

    a. Geographic, hydrographic, hydrological, climatic ecological and other factors of a natural character;

    b. The social economic needs of each Partner States

    c. The population dependent on the water resources in each Partner States;

    d. The effects of the use or uses of the water resources in one Partner State on other Partner States;

    e. Existing and potential uses of the water resources;

    f. Conservation, protection, development and sustainable use of the water resources and the costs of the measures taken to that effect;

    g. The comparative costs alternative means of satisfying the economic and social needs of each Partner States; and

    h. The availability of alternatives of comparable value to particular planned or existing use.

4. In determining what is reasonable and equitable use, all relevant factors shall be considered together and a conclusion reached on the basis of the whole. The weight of each factor shall be determined by its importance in comparison with that of other relevant factors.
5. The Partner States shall, in their respective territories, keep the status of their water of their water utilization under review in light of substantial changes and relevant factors and circumstances.

6. In view of the relationship between the Lake Victoria Basin and the Nile River Basin, the Partner States shall cooperate with other interested parties, regional or international bodies and programmes and in so doing, the Partner States shall negotiate as bloc.

ARTICLE 6
PROTECTION AND CONSERVATION OF THE BASIN AND ITS ECOSYSTEMS

1. The Partner States shall take all appropriate measures, individually or jointly and where appropriate with participation of all stakeholders to protect, conserve and where necessary rehabilitate the Basin and its ecosystems in particular by;

a. Protecting and improving water quantity and quality within the Basin;

b. Preventing the introduction of species, alien or new into the Basin's water resources which may have effects detrimental to the ecosystems of the Lake;

c. Identifying the components of and developing strategies for protecting and conserving biological diversity within the Basin;

d. Conserving migratory species of wild animals;

e. Conserving endangered species of wild fauna and flora;

f. Protection and conserving westlands within the basin;

g. Restoring and rehabilitating degraded natural resources; and

h. Conserving fisheries Resources.

2. The Partner States shall through the institutional framework established under this Protocol, take steps to harmonize their laws and policies in relation to 1 of this Article.

ARTICLE 7
SUSTAINABLE DEVELOPMENT OF NATURAL RESOURCES

The Partner States shall manage, develop and utilize the natural resources of the Basin in a sustainable manner.

ARTICLE 8
SUSTAINABLE DEVELOPMENT AND MANAGEMENT OF FISHERIES RESOURCES

The Partner States shall manage, develop and utilize Fishery resources of the Basin in accordance with the Convention establishing the Lake Victoria Fisheries Organization.

ARTICLE 9
SUSTAINABLE AGRICULTURE AND LAND USE PRACTICES
The Partner States shall promote sustainable agriculture and land use practices in order to achieve food security and rational agricultural production within the Basin in accordance with the provisions of Article 105, 106,107,108, 109 and 110 of the Treaty.

ARTICLE 10
TOURISM DEVELOPMENT
The Partner States shall undertake to develop a collective andcoordinated approach to the promotion of and marketing of sustainable tourism with the provisions of Article 115 and 116 of the Treaty.

ARTICLE 11
PROMOTION OF TRADE, COMMERCE AND INDUSTRY
The Partner States shall undertake to promote Trade, Commerce and Industry in the Basin in accordance with the relevant provision in the/Treaty.

ARTICLE 12
ENVIRONMENT IMPACT ASSESSMENT

1. The Partners States shall develop national laws and regulations requiring developers of projects to undertake environmental impact assessment of planned activities, which are likely to have a significant impact on the resources of the Basin.

2. The Significance of the impact under paragraph 1 of this Article shall be determined in accordance with the procedures and guidelines development through a process of public participation by the Secretariat, and approved by the Council.

3. Where pursuant to an environmental impact assessment, a Partner State determines that a project is likely to have a significant transboundary effect on the resources of the Basin; such a State shall avail to other Partner State s and the Secretariat, the environmental impact statement for comments.

4. In determining whether to approve an environmental impact statement for a project with transboundary effects, the Partner State in whose jurisdiction the project is proposed, shall take into account the comments of the other Partner States.

5. A Partner State, whose views on the environmental impact statement or report are not taken into account, may invoke the dispute settlement procedure under Article 46 of this Protocol by notifying the Partner State and the Secretariat of its intention.

ARTICLE 13
PRIOR NOTIFICATION CONCERNING PLANNED MEASURES

1. A Partner State shall notify other Partner States and the Secretariat of planned activities within its territory that may have adverse effects upon those other Partner States.

2. The notifying Partner State shall provide technical data and informationconcerning the planned project to enable the notified Partner States to evaluate the effects of the planned measures.

3. The notification shall be followed by consultation among the Partner States in respect of the planned measures.

4. The notifying Partner State shall take into account the interest of the other Partner States in developing the planned measures.

ARTICLE 14
ENVIRONMENTAL AUDITS

1. The Partner States shall adopt policies, laws and regulations within their respective jurisdiction to guide the operator's facilities likely to have a significant impact on the environment in undertaking environmental audits of existing activities.

2. The policies, laws and regulations under Paragraph 1 of this Article shallbe developed in accordance with the guidelines developed through a process of public participation by the Secretariat and adopted by the Council.

3. The Partner States shall harmonize their laws and regulation to conform to the guidelines formulated by the Community.

ARTICLE 15
PREVENTION OF SIGNIFICANT HARM TO NEIGHBOURS

1. A Partner State shall, when utilizing the resources of the Basin in its jurisdiction, take all appropriate measures to prevent significant environmental harm to other Partner States.

2. A Partner State shall, in utilizing the natural resources of the Basin take into account the vital economic, social and cultural interest of other Partner States.

ARTICLE 16
MONITORING AND PRECAUTIONARY MEASURES

1. Each Partner State shall, within its jurisdiction, monitor activities and natural phenomena with a view to determining the potential risk they pose to the resources of the Basin and its people.

2. The Partner States shall adopt standardized equipment and methods of monitoring natural phenomena.

3. Where there is a threat to the environment, the Partner States shall undertake such precautionary and pre-emptive measures as may be in the circumstances.

4. The precautionary approaches to protect the environment provided for in this Article shall be undertaken by the Partner States, even where there is no scientific certainty, according to their capabilities.

ARTICLE 17
APPLICATION OF THE “POLLUTER PAYS” PRINCIPLE
1. The Partner State take necessary legal, social and economic measures to ensure that a polluter pays as near as possible the cost of the pollution resulting from their activities.
2. The costs recovered from the polluter shall be used for clean up operations and restorations by that Partner State.

ARTICLE 18
APPLICATION OF THE “USER PAYS” PRINCIPLE
1. The Partner States shall, jointly or individually, put in place measures for recovery of costs for the large-scale uses of the water resources of the Basin.
2. The Costs recovered from the users by each Partner State share be used by that Partner State in meeting costs of management operations and restoration in the Basin.

ARTICLE 19
PREVENTING POLLUTION AT SOURCE
1. The Partner State Shall:
a) Require developers of planned activities to put in place measures which prevent pollution, and where prevention is not possible, minimize pollution.

b) Put in place measures that conduce operators of existing facilities to avoid, reduce, minimize and control pollution from such facilities.

c) To develop sustainable mining and mineral and processing methods.

2. The Partner States shall adopt those measures to economic realities of the Basin, including the ability of the owners of regulated entities to afford remedial measures provided that those realities are compatible with the long-term need of sustainable development.
3. Partner States shall adopt measures to reduce municipal waste input into the Lake.

ARTICLE 20
PREVENTION OF POLLUTION FROM NON-POINT SOURCES
The Partner States shall take all appropriate legal, economic realities of the Basin, including the ability of the owners of the regulated entities to afford remedial measures provided that those realities are compatible with the long-term need of sustainable development.
a) Sustainable forestry practices, agro-foresty, afforestation, reforestation and good pasture husbandry;
b) Appropriate agricultural land use methods, soil conservation, control and minimization of the use of agricultural chemical inputs;
c) General land use planning and enforcement of urban planninglaws;
d) Sanitation and hygiene in the Basin.

ARTICLE 21
PUBLIC EDUCATION AND AWARESS
1. The Partner States shall:
a. Promote and encourage awareness of the importance of, and the measures required for, the sustainable development of the Basin; and
b. Co-operate, as appropriate, with other States and international organizations in developing educational and public awareness programmes, with respect to conservation and sustainable use of the resources of Basin.

2. To achieve the objectives set out in paragraph 1 of this Article, the Partner States shall employ various strategies including the use of the media, and the inclusion of these topics in educational programmes.

ARTICLE 22
PUBLIC PARTICIPATION
The Partner States shall create an environment conducive for stakeholders' views to influence governmental decisions on project formulation and implementation.

ARTICLE 23
MAINSTREAMING OF GENDER CONCERNS
The Partner States shall promote community involvement and mainstreaming of gender concerns at all levels of socio-economic development, especially with regard to decision-making, policy formulation and implementation of projects and programmes.

ARTICLE 24
EXCHANGE OF DATA AND INFORMATION

1. The Partner States shall, on a regulator basis, exchange readily available and relevant data and information on existing measures and on the condition of the natural resources of the Basin, where possible in a form that facilitates its utilization by the Partner States to which it is communicated
2. A Partner State that is requested by another Partner State to provide data or information which is not readily available, shall employ its best efforts to comply with the request but may condition its compliance upon payment by the requesting Partner State of the reasonable costs of collecting and, where appropriate, processing such data or information.
3. The Partner States shall also provide an environment that is conducive for facilitating collaboration in research and the exchange of data, report and information among stakeholders belonging to Partner Statesi n the Basin through.
4. The exchange of information and data shall not extend to information protected under any law of a Partner State or an international treaty to which the Partner State is a party.

ARTICLE 25
WATER RESOURCES MONITORING, SURVEILANCE AND STANDARD SETTING
1. The Partner States shall establish and harmonies their water quality standards.
2. The Partner States shall, in their respective territories, establish water quality and quantity monitoring and surveillance stations and water quality and quantity control laboratories.
3. The Partner States shall exchange water quality and quantity data in accordance with guidelines to be established by the Partner States.

ARTICLE 26
Emergencies and Disaster Preparedness
1. A Partner State shall, without delay and by the most expeditious means available, notify other potentially affected Partner States, the Commission and competent international Organizations of any emergency originating within its territory.
2. A Partner State within whose territory an emergency originates shall, in co-operation with potentially affected Partner States and, where appropriate, competent international organizations, immediately take all practicable measures necessitate by circumstances to prevent, mitigate and eliminate harmful effects of the emergency.

3. The Partner State shall jointly develop disaster preparedness plans for responding to emergencies on the Lake and its potentially affected states and competent international organizations.

ARTICLE 27
Management Plans
1. Each Partner State shall;
a) Develop national strategies, plans or programmes for conservation and sustainable use of the resources of the Basin or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Protocol; including the development of infrastructure, commerce and trade, tourism,research and development; and
b) Intergrate, as far as possible and as appropriate, the conservation and sustainable use of the resources of the Basin into relevant sectoral or cross-sectoral plans, programmes and policies.
2. The Commission shall develop a management for the conservation and the sustainable utilization of the resources of the Basin. Themanagement plan shall be harmonized with National Plans developed under paragraph 1 of the Article and approved by the Council.

ARTICLE 28
Improvement of Security
1. Partner States shall put in place national legislation to enforce maritime security.
2. The Partner States shall co-ordinate security arrangement and operations on the Lake aimed at controlling acts of piracy and banditry on the lake and its stores.
3. The Partner States shall collaborate and coordinate their policies and activities to curtail smuggling on the Lake.

ARTICLE 29
Infrastructure and Services
1. Partner States shall promote development of infrastrure and services in the Lake Victoria Basin in accordance with Articles 89, 90,91,93,94,95 and 100 of the Treaty.
2. The Partner States shall establish, develop, harmonise and improve infrastructure and services including:
a) Inland waterways and ports;
b) Telecommunications and postal services;
c) Roads and railways systems;
d) Air transport;
e) Meteorological services; and
f) Information and communication technologies.

ARTICLE 30
Energy
The Partner States shall co-ordinate the development of their energy policies and supply systems in the Basin in accordance with Article 101 of the Treaty.

ARTICLE 31
Safety of Navigation
The Partner States shall implement and review existing agreements relating to the promotion of safety of navigation on Lake Victoria by:-
a) Implementing and where necessary, reviewing exiting agreements relating to the promotion of the safety of navigation, maritime safety and preservation of the marine environment; and

b) Initiating and promoting programmes as well as establishing a mechanism that will establish a mechanism that will enhance maritime safety on the Lake.

ARTICLE 32
Prohibition of Dumping of Waste
The Partner States enact and harmonise laws and policies for:
a) The prevention of pollution from vessels which dump wastes into the Lake; and
b) Regulating the movement of hazardous wastes in the Basin.

ARTICLE 33
Institutional Framework
1. The Council of Ministers hereby establishes a body for the sustainable development and management of the Lake Victoria Basin to be known as the Lake Victoria Basin Commission.
2. The objectives of the Commission shall be to:-
a) Promote equitable economic growth;
b) Promote measures aimed at eradicating poverty;
c) Promote sustainable utilization and management natural resources;
d) Promote the protection of the environment within the Lake Victoria Basin: and
e) Promote compliance on safety of navigation.
3. The broad functions of the Commission shall be to promote, facilitate and coordinate activities of different actors towards sustainable development and poverty eradication of the Lake Victoria Basin in the following manner;
a) Harmonization of policies, laws, regulations and standards;
b) Promotion of stakeholders' participation in sustainable development of natural resources;
c) Guidance on implementation of sectoral projects and programmes;
d) Promotion of capacity building and Institutional development;
e) Promotion of security and safety on the Lake;
f) Promotion of research development and demonstration;
g) Monitoring, evaluation and compliance with policies and agreed actions;
h) Prepare and harmonize negotiating positions for the Partners States against any other State on matters concerning the Lake Victoria Basins.
i) Receive and consider reports from Partner States institutions on their activities relating to the management of the Basin under this Protocol.
j) Initiation and promotion of programmes that target poverty eradication; and
k) Performance any other functions that may be conferred upon it under this Protocol.

ARTICLE 34
Organizational Structure
The Lake Victoria Basin Commission shall be an institution of that East African Community as provided for in the Treaty and should operate within the following organizational structure:-
a) The Sectoral Council;
b) The Coordination Committee;
c) The Sectoral Committee;
d) The Secretariat of the Commission.

ARTICLE 35
The Sectoral Council
The Sectoral Council on Lake Victoria as established shall be responsible for matter created under this Protocol and shall perform the following functions:-

a) Provide overall policy directions for the implementation of projects and programmes in the Lake Victoria Basin.
b) Guide the implementation of development programmes in Lake Victoria Basin;
c) Make regulations, issue directives, take decisions and make recommendations and give opinions in accordance with the provisions of this Protocol;
d) Consider and approve measures that should be undertaken by Partner States in order to promote the attainment of the objectives of this Protocol;
e) Formulate financial rules and regulations;
f) Approve terms and conditions of service for the staff of the Commission;
g) Adopt annual progress reports from the Coordinate Committee;
h) Promulgates its own rules procedures of decisions making consistent with the Treaty; and
i) Perform its functions as provided for in the Treaty.

ARTICLE 36
Co ordination Committee
1) The Co-ordination Committee for Lake Victoria Basin as established shall be responsible for matters created under this Protocol and shall perform the following functions:-
a) Submit reports and recommendations to the Sectoral Council on the implementation of this Protocol;
b) Implement the decisions of the Sectoral Council as may be directed from time to time;
c) Receive and consider reports of Sectoral Committee;
d) Assign any Sectoral Committee to deal with any matter relevant to Lake Victoria Basin; and
e) Perform such other functions as may be conferred upon it by this Protocol or as may, from time to time, be directed by the Council.
2) Subject to any directions, which may be given by the Council, the coordination Committee shall meet at least twice in each year preceding the meetings of the Council and may hold extra-ordinary meetings, as it deems necessary.
3) The Co-ordination Committee shall determine shall determine its own Rules of Procedure to transact business consistent with the Treaty.

ARTICLE 37
Establishment and Composition of Sectoral Committee
1) The Co-ordination Committee shall recommend to the Council to establish such Sectoral Committee as are outlined in the Scope of Cooperation stated in Article 3 of this Protocol.
2) In so doing the Co-ordination Committee shall take cognizance of the existing sectoral bodies and seek to have operational linkages.
3) The Sectoral Committees shall be composed of Senior Officials of Partners States, Head of Public Institutions, representatives of Regional Institutions, representatives from sectors covered under Article 3 of this Protocol, business and industry and Civil Society.
4) The Partner States shall establish National Focal Points, which shall be
responsible for coordinating national initiatives of thee Lake Victoria Basin and share information with the Commission and other Stakeholders.

ARTICLE 40
The Fuctions of the Executive Secretary
1. The Executive Secretary shall:-
a) Implement the Work of the Commission in accordance with the policy and decisions of the Sectoral Council;

b) Submit reports on the work of the Commission as well as the audited accounts to the Council;
c) Be the accounting officer of the Commission;
d) Carry out such other duties as are conferred by this Protocol or as may be directed by the Sectoral Council from time to time.
2. The Executive Secretary shall service a fixed five-year term.
3. The Executive Secretary shall be assisted by the Deputy Executive Secretary appointed by the Council who shall serve on a three year term renewable once on rotational basis. The Deputy Executive Secretary shall be of a national different from that of the Executive Secretary.

ARTICLE 41
Other Officers of the Commission
1. There shall be such other officers and staff in the service of the Commission as may be determined by the Sectoral Council.
2. All staff of the Commission shall be appointed on contract and in accordance with staff rules, regulations, terms and conditions of service of the Community.
3. The Terms and Conditions of Service of the Commission shall be determined by the Council.

ARTICLE 42
Functions of the Secretariat
1. The functions of the Secretariat shall be to:-
a) Coordinate all activities within the scope of the Protocol;
b) Initiate the coordination and harmonization of the policies and strategies related to the development of the Commission;
c) Establish a regional database and promote sharing of information and development of information systems and data exchange;
d) Convene meetings of Sectoral Committees of the Commission and other Working Groups;
e) Facilitate research and studies on sustainable development of the Basin;
f) Submit reports to the Sectoral Council through the Co-ordination Committee;
g) Generally undertake the administration and financial management of the Commission;
h) Disseminate information on the Commission to Stakeholders and the international Community;
i) Mobilize resources for the implementation of the projects and programmes of the Commission;
j) Develop a sustainable funding mechanism for facilitating sustainable development in the Basin;
k) Implement the decisions of the Sectoral Council and;
l) Perform such other functions as may be conferred on it by or under this Protocol.
2. In coordinating the preparation, negation and implementation of national and regional programmes the Commission shall involve, as appropriate, other parties and relevant inter-governmental and nongovernmental organizations in the implantation of this Protocol.

ARTICLE 46
Dispute Settlement
1) In the event of a dispute between Partner States concerning the interpretation or application of this Protocol, the Partner States concerned shall seek solution by negotiation.

2) If the Partner States do not resolve the dispute by negotiating, either Partner State or the Secretary General may refer such dispute to the East African Court of Justice in accordance with Articles 28 and 29 of the Treaty.
3) The decision of the East African Court of Justice on any dispute referred to it under this Protocol shall be final.

ARTICLE 47
Relationship between this Protocol and the Treaty
This Protocol shall upon entry into force be an integral part of the Treaty and in case of an inconsistency between this Protocol and the Treaty, the Treaty shall prevail.

ARTICLE 48
Relationship with other Agreement on Lake Victoria
1) The provisions of this Protocol shall take precedence over any other existing agreements relating to Lake Victoria and in case any other agreement is inconsistence with this Protocol, it shall be null and void to the extent of its inconsistency.
2) Where the exercise of rights and obligations originating from an existing agreement relating to the Lake, is likely to cause serious damage or threat to the Lake Victoria Basin and people, the Partner States shall as soon as practicable enter into negotiations or take other measures to remedy the situation.

ARTICLE 49
Entry into Force
This Protocol shall enter into force upon ratification and deposit of instruments of ratification with the Secretary General by all Partner States.

ARTICLE 50
Accession
1) A State, which becomes a party to the Treaty, may become a party to this Protocol by depositing an instrument of accession to the Protocol with the Depositary.

2) In cases of accession, the Protocol shall enter into force for the party acceding, thirty days after the date of the deposit of the instrument of accession.

ARTICLE 51
Amendment
This Protocol may be amended any time by the agreement of the Partner States in accordance with Article 150 of the Treaty.

ARTICLE 52
Saving Provisions
Institutions and programmes of co-operation existing prior to this Protocol shall be accommodated under the institutional framework of this Protocol.
DONE at Arusha, Tanzania on this 29th day of November in the year Two Thousand and Three.
IN FAITH WHEREOF the undersigned have appended their signatures hereto.

APPENDIX 5
Agenda 21: Chapter 18

PROTECTION OF THE QUALITY AND SUPPLY OF FRESHWATER RESOURCES: APPLICATION OF INTEGRATED APPROACHES TO THE DEVELOPMENT, MANAGEMENT AND USE OF WATER RESOURCES

18.1. Freshwater resources are an essential component of the Earth's hydrosphere and an indispensable part of all terrestrial ecosystems. The freshwater environment is characterized by the hydrological cycle, including floods and droughts, which in some regions have become more extreme and dramatic in their consequences. Global climate change and atmospheric pollution could also have an impact on freshwater resources and their availability and, through sea-level rise, threaten low-lying coastal areas and small island ecosystems.

18.2. Water is needed in all aspects of life. The general objective is to make certain that adequate supplies of water of good quality are maintained for the entire population of this planet, while preserving the hydrological, biological and chemical functions of ecosystems, adapting human activities within the capacity limits of nature and combating vectors of water-related diseases. Innovative technologies, including the improvement of indigenous technologies, are needed to fully utilize limited water resources and to safeguard those resources against pollution.

18.3. The widespread scarcity, gradual destruction and aggravated pollution of freshwater resources in many world regions, along with the progressive encroachment of incompatible activities, demand integrated water resources planning and management. Such integration must cover all types of interrelated freshwater bodies, including both surface water and groundwater, and duly consider water quantity and quality aspects. The multisectoral nature of water resources development in the context of socio-economic development must be recognized, as well as the multi-interest utilization of water resources for water supply and sanitation, agriculture, industry, urban development, hydropower generation, inland fisheries, transportation, recreation, low and flat lands management and other activities. Rational water utilization schemes for the development of surface and underground water-supply sources and other potential sources have to be supported by concurrent water conservation and wastage minimization measures. Priority, however, must be accorded to flood prevention and control measures, as well as sedimentation control, where required.

18.4. Transboundary water resources and their use are of great importance to riparian States. In this connection, cooperation among those States may be desirable in conformity with existing agreements and/or other relevant arrangements, taking into account the interests of all riparian States concerned.

18.5. The following programme areas are proposed for the freshwater sector:

(a) Integrated water resources development and management;

(b) Water resources assessment;

(c) Protection of water resources, water quality and aquatic ecosystems;

(d) Drinking-water supply and sanitation;

(e) Water and sustainable urban development;

(f) Water for sustainable food production and rural development;

(g) Impacts of climate change on water resources.

PROGRAMME AREAS

A. Integrated water resources development and management

Basis for action

18.6. The extent to which water resources development contributes to economic productivity and social well-being is not usually appreciated, although all social and economic activities rely heavily on the supply and quality of freshwater. As populations and economic activities grow, many countries are rapidly reaching conditions of water scarcity or facing limits to economic development. Water demands are increasing rapidly, with 70-80 per cent required for irrigation, less than 20 per cent for industry and a mere 6 per cent for domestic consumption. The holistic management of freshwater as a finite and vulnerable resource, and the integration of sectoral water plans and programmes within the framework of national economic and social policy, are of paramount importance for action in the 1990s and beyond. The fragmentation of responsibilities for water resources development among sectoral agencies is proving, however, to be an even greater impediment to promoting integrated water management than had been anticipated. Effective implementation and coordination mechanisms are required.

Objectives

18.7. The overall objective is to satisfy the freshwater needs of all countries for their sustainable development.

18.8. Integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality determine the nature of its utilization. To this end, water resources have to be protected, taking into account the functioning of aquatic ecosystems and the perenniality of the resource, in order to satisfy and reconcile needs for water in human activities. In developing and using water resources, priority has to be given to the satisfaction of basic needs and the safeguarding of ecosystems. Beyond these requirements, however, water users should be charged appropriately.

18.9. Integrated water resources management, including the integration of land- and water-related aspects, should be carried out at the level of the catchment basin or sub-basin. Four principal objectives should be pursued, as follows:

(a) To promote a dynamic, interactive, iterative and multisectoral approach to water resources management, including the identification and protection of potential sources of

freshwater supply, that integrates technological, socio-economic, environmental and human health considerations;

(b) To plan for the sustainable and rational utilization, protection, conservation and management of water resources based on community needs and priorities within the framework of national economic development policy;

(c) To design, implement and evaluate projects and programmes that are both economically efficient and socially appropriate within clearly defined strategies, based on an approach of full public participation, including that of women, youth, indigenous people and local communities in water management policy-making and decision-making;

(d) To identify and strengthen or develop, as required, in particular in developing countries, the appropriate institutional, legal and financial mechanisms to ensure that water policy and its implementation are a catalyst for sustainable social progress and economic growth.

18.10. In the case of transboundary water resources, there is a need for riparian States to formulate water resources strategies, prepare water resources action programmes and consider, where appropriate, the harmonization of those strategies and action programmes.

18.11. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could set the following targets:

A) By the year 2000:

i. To have designed and initiated costed and targeted national action programmes, and to have put in place appropriate institutional structures and legal instruments;
ii. To have established efficient water-use programmes to attain sustainable resource utilization patterns;

B) By the year 2025:

i. To have achieved subsectoral targets of all freshwater programme areas.

It is understood that the fulfilment of the targets quantified in (i) and (ii) above will depend upon new and additional financial resources that will be made available to developing countries in accordance with the relevant provisions of General Assembly resolution 44/228.

Activities

18.12. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could implement the following activities to improve integrated water resources management:

(a) Formulation of costed and targeted national action plans and investment programmes;

(b) Integration of measures for the protection and conservation of potential sources of freshwater supply, including the inventorying of water resources, with land-use planning, forest resource utilization, protection of mountain slopes and riverbanks and other relevant development and conservation activities;

(c) Development of interactive databases, forecasting models, economic planning models and methods for water management and planning, including environmental impact assessment methods;

(d) Optimization of water resources allocation under physical and socio-economic constraints;

(e) Implementation of allocation decisions through demand management, pricing mechanisms and regulatory measures;

(f) Flood and drought management, including risk analysis and environmental and social impact assessment;

(g) Promotion of schemes for rational water use through public awareness-raising, educational programmes and levying of water tariffs and other economic instruments;

(h) Mobilization of water resources, particularly in arid and semi-arid areas;

(i) Promotion of international scientific research cooperation on freshwater resources;

(j) Development of new and alternative sources of water-supply such as sea-water desalination, artificial groundwater recharge, use of marginal-quality water, waste-water reuse and water recycling;

(k) Integration of water (including surface and underground water resources) quantity and quality management;

(l) Promotion of water conservation through improved water-use efficiency and wastage minimization schemes for all users, including the development of water-saving devices;

(m) Support to water-users groups to optimize local water resources management;

(n) Development of public participatory techniques and their implementation in decision-making, particularly the enhancement of the role of women in water resources planning and management;

(o) Development and strengthening, as appropriate, of cooperation, including mechanisms where appropriate, at all levels concerned, namely:

i) At the lowest appropriate level, delegation of water resources management, generally, to such a level, in accordance with national legislation, including decentralization of government services to local authorities, private enterprises and communities;

ii) At the national level, integrated water resources planning and management in the framework of the national planning process and, where appropriate, establishment of

independent regulation and monitoring of freshwater, based on national legislation and economic measures;

iii) At the regional level, consideration, where appropriate, of the harmonization of national strategies and action programmes;

iv) At the global level, improved delineation of responsibilities, division of labour and coordination of international organizations and programmes, including facilitating discussions and sharing of experiences in areas related to water resources management;

p) Dissemination of information, including operational guidelines, and promotion of education for water users, including the consideration by the United Nations of a World Water Day.

Means of implementation

A) Financing and cost evaluation

18.13. The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about $115 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific strategies and programmes Governments decide upon for implementation.

B) Scientific and technological means

18.14. The development of interactive databases, forecasting methods and economic planning models appropriate to the task of managing water resources in an efficient and sustainable manner will require the application of new techniques such as geographical information systems and expert systems to gather, assimilate, analyse and display multisectoral information and to optimize decision-making. In addition, the development of new and alternative sources of water-supply and low-cost water technologies will require innovative applied research. This will involve the transfer, adaptation and diffusion of new techniques and technology among developing countries, as well as the development of endogenous capacity, for the purpose of being able to deal with the added dimension of integrating engineering, economic, environmental and social aspects of water resources management and predicting the effects in terms of human impact.

18.15. Pursuant to the recognition of water as a social and economic good, the various available options for charging water users (including domestic, urban, industrial and agricultural water-user groups) have to be further evaluated and field-tested. Further development is required for economic instruments that take into account opportunity costs and environmental externalities. Field studies on the willingness to pay should be conducted in rural and urban situations.

18.16. Water resources development and management should be planned in an integrated manner, taking into account long-term planning needs as well as those with narrower horizons, that is to say, they should incorporate environmental, economic and social considerations based on the principle of sustainability; include the requirements of all users

as well as those relating to the prevention and mitigation of water-related hazards; and constitute an integral part of the socio-economic development planning process. A prerequisite for the sustainable management of water as a scarce vulnerable resource is the obligation to acknowledge in all planning and development its full costs. Planning considerations should reflect benefits investment, environmental protection and operation costs, as well as the opportunity costs reflecting the most valuable alternative use of water. Actual charging need not necessarily burden all beneficiaries with the consequences of those considerations. Charging mechanisms should, however, reflect as far as possible both the true cost of water when used as an economic good and the ability of the communities to pay.

18.17. The role of water as a social, economic and life-sustaining good should be reflected in demand management mechanisms and implemented through water conservation and reuse, resource assessment and financial instruments.

18.18. The setting afresh of priorities for private and public investment strategies should take into account a) maximum utilization of existing projects, through maintenance, rehabilitation and optimal operation; (b) new or alternative clean technologies; and (c) environmentally and socially benign hydropower.

C) Human resources development

18.19. The delegation of water resources management to the lowest appropriate level necessitates educating and training water management staff at all levels and ensuring that women participate equally in the education and training programmes. Particular emphasis has to be placed on the introduction of public participatory techniques, including enhancement of the role of women, youth, indigenous people and local communities. Skills related to various water management functions have to be developed by municipal government and water authorities, as well as in the private sector, local/national non-governmental organizations, cooperatives, corporations and other water-user groups. Education of the public regarding the importance of water and its proper management is also needed.

18.20. To implement these principles, communities need to have adequate capacities. Those who establish the framework for water development and management at any level, whether international, national or local, need to ensure that the means exist to build those capacities. The means will vary from case to case. They usually include:

(a) Awareness-creation programmes, including mobilizing commitment and support at all levels and initiating global and local action to promote such programmes;

(b) Training of water managers at all levels so that they have an appropriate understanding of all the elements necessary for their decision-making;

(c) Strengthening of training capacities in developing countries;

(d) Appropriate training of the necessary professionals, including extension workers;

(e) mprovement of career structures;

Sharing of appropriate knowledge and technology, both for the collection of data and for the implementation of planned development including non-polluting technologies and the knowledge needed to extract the best performance from the existing investment system.

D) Capacity-building

18.21. Institutional capacity for implementing integrated water management should be reviewed and developed when there is a clear demand. Existing administrative structures will often be quite capable of achieving local water resources management, but the need may arise for new institutions based upon the perspective, for example, of river catchment areas, district development councils and local community committees. Although water is managed at various levels in the socio-political system, demand-driven management requires the development of water-related institutions at appropriate levels, taking into account the need for integration with land-use management.

18.22. In creating the enabling environment for lowest-appropriate-level management, the role of Government includes mobilization of financial and human resources, legislation, standard-setting and other regulatory functions, monitoring and assessment of the use of water and land resources, and creating of opportunities for public participation. International agencies and donors have an important role to play in providing support to developing countries in creating the required enabling environment for integrated water resources management. This should include, as appropriate, donor support to local levels in developing countries, including community-based institutions, non-governmental organizations and women's groups.

B. Water resources assessment

Basis for action

18.23. Water resources assessment, including the identification of potential sources of freshwater supply, comprises the continuing determination of sources, extent, dependability and quality of water resources and of the human activities that affect those resources. Such assessment constitutes the practical basis for their sustainable management and a prerequisite for evaluation of the possibilities for their development. There is, however, growing concern that at a time when more precise and reliable information is needed about water resources, hydrologic services and related bodies are less able than before to provide this information, especially information on groundwater and water quality. Major impediments are the lack of financial resources for water resources assessment, the fragmented nature of hydrologic services and the insufficient numbers of qualified staff. At the same time, the advancing technology for data capture and management is increasingly difficult to access for developing countries. Establishment of national databases is, however, vital to water resources assessment and to mitigation of the effects of floods, droughts, desertification and pollution.

Objectives

18.24. Based upon the Mar del Plata Action Plan, this programme area has been extended into the 1990s and beyond with the overall objective of ensuring the assessment and forecasting of the quantity and quality of water resources, in order to estimate the total quantity of water resources available and their future supply potential, to determine their

current quality status, to predict possible conflicts between supply and demand and to provide a scientific database for rational water resources utilization.

18.25. Five specific objectives have been set accordingly, as follows:

(a) To make available to all countries water resources assessment technology that is appropriate to their needs, irrespective of their level of development, including methods for the impact assessment of climate change on freshwaters;

(b) To have all countries, according to their financial means, allocate to water resources assessment financial resources in line with the economic and social needs for water resources data;

(c) To ensure that the assessment information is fully utilized in the development of water management policies;

(d) To have all countries establish the institutional arrangements needed to ensure the efficient collection, processing, storage, retrieval and dissemination to users of information about the quality and quantity of available water resources at the level of catchments and groundwater aquifers in an integrated manner;

(d) To have sufficient numbers of appropriately qualified and capable staff recruited and retained by water resources assessment agencies and provided with the training and retraining they will need to carry out their responsibilities successfully.

18.26. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including cooperation with the United Nations and other relevant organizations, as appropriate, could set the following targets:

(a) By the year 2000, to have studied in detail the feasibility of installing water resources assessment services;

(b) As a long-term target, to have fully operational services available based upon high-density hydrometric networks.

Activities

18.27. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could undertake the following activities:

A)Institutional framework:

i) Establish appropriate policy frameworks and national priorities;

ii) Establish and strengthen the institutional capabilities of countries, including legislative and regulatory arrangements, that are required to ensure the adequate assessment of their water resources and the provision of flood and drought forecasting services;

iii) Establish and maintain effective cooperation at the national level between the various agencies responsible for the collection, storage and analysis of hydrologic data;

iv) Cooperate in the assessment of transboundary water resources, subject to the prior agreement of each riparian State concerned;

B) Data systems:

i) Review existing data-collection networks and assess their adequacy, including those that provide real-time data for flood and drought forecasting;

ii) Improve networks to meet accepted guidelines for the provision of data on water quantity and quality for surface and groundwater, as well as relevant land-use data;

iii) Apply standards and other means to ensure data compatibility;

iv) Upgrade facilities and procedures used to store, process and analyse hydrologic data and make such data and the forecasts derived from them available to potential users;

v) Establish databases on the availability of all types of hydrologic data at the national level;

vi) Implement "data rescue" operations, for example, establishment of national archives of water resources;

vii) Implement appropriate well-tried techniques for the processing of hydrologic data;

viii) Derive area-related estimates from point hydrologic data;

ix) Assimilate remotely sensed data and the use, where appropriate, of geographical information systems;

C) Data dissemination:

i) Identify the need for water resources data for various planning purposes;

ii) Analyse and present data and information on water resources in the forms required for planning and management of countries' socio-economic development and for use in environmental protection strategies and in the design and operation of specific water-related projects;

iii) Provide forecasts and warnings of flood and drought to the general public and civil defence;

D) Research and development:

i) Establish or strengthen research and development programmes at the national, subregional, regional and international levels in support of water resources assessment activities;

ii)Monitor research and development activities to ensure that they make full use of local expertise and other local resources and that they are appropriate for the needs of the country or countries concerned.

Means of implementation

(A) Financing and cost evaluation

18.28. The Conference secretariat has estimated the everage total annual cost (1993-2000) of implementing the activities of this programme to be about $355 million, including about $145 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional will depend upon, inter alia, the specific strategies and programmes Governments decide upon for implementation.

(B) Scientific and technological means

18.29. Important research needs include (a) development of global hydrologic models in support of analysis of climate change impact and of macroscale water resources assessment; (b) closing of the gap between terrestrial hydrology and ecology at different scales, including the critical water-related processes behind loss of vegetation and land degradation and its restoration; and (c) study of the key processes in water-quality genesis, closing the gap between hydrologic flows and biogeochemical processes. The research models should build upon hydrologic balance studies and also include the consumptive use of water. This approach should also, when appropriate, be applied at the catchment level.

18.30. Water resources assessment necessitates the strengthening of existing systems for technology transfer, adaptation and diffusion, and the development of new technology for use under field conditions, as well as the development of endogenous capacity. Prior to inaugurating the above activities, it is necessary to prepare catalogues of the water resources information held by government services, the private sector, educational institutes, consultants, local water-use organizations and others.

C) Human resource development

18.31. Water resources assessment requires the establishment and maintenance of a body of well-trained and motivated staff sufficient in number to undertake the above activities. Education and training programmes designed to ensure an adequate supply of these trained personnel should be established or strengthened at the local, national, subregional or regional level. In addition, the provision of attractive terms of employment and career paths for professional and technical staff should be encouraged. Human resource needs should be monitored periodically, including all levels of employment. Plans have to be established to meet those needs through education and training opportunities and international programmes of courses and conferences.

18.32. Because well-trained people are particularly important to water resources assessment and hydrologic forecasting, personnel matters should receive special attention in this area. The aim should be to attract and retain personnel to work on water resources assessment who are sufficient in number and adequate in their level of education to ensure the effective implementation of the activities that are planned. Education may be called for at both the national and the international level, with adequate terms of employment being a national responsibility.

18.33. Recommended actions include:

(a) Identifying education and training needs geared to the specific requirements of countries;

(b) Establishing and strengthening education and training programmes on water-related topics, within an environmental and developmental context, for all categories of staff involved in water resources assessment activities, using advanced educational technology, where appropriate, and involving both men and women;

(c) Developing sound recruitment, personnel and pay policies for staff of national and local water agencies.

D) Capacity-building

18.34. The conduct of water resources assessment on the basis of operational national hydrometric networks requires an enabling environment at all levels. The following national support action is necessary for enhanced national capacities:

(a) Review of the legislative and regulatory basis of water resources assessment;

(b) Facilitation of close collaboration among water sector agencies, particularly between information producers and users;

(c) Implementation of water management policies based upon realistic appraisals of water resources conditions and trends;

(d) Strengthening of the managerial capabilities of water-user groups, including women, youth, indigenous people and local communities, to improve water-use efficiency at the local level.

C. Protection of water resources, water quality and aquatic ecosystems

Basis for action

18.35. Freshwater is a unitary resource. Long-term development of global freshwater requires holistic management of resources and a recognition of the interconnectedness of the elements related to freshwater and freshwater quality. There are few regions of the world that are still exempt from problems of loss of potential sources of freshwater supply, degraded water quality and pollution of surface and groundwater sources. Major problems affecting the water quality of rivers and lakes arise, in variable order of importance according to different situations, from inadequately treated domestic sewage, inadequate controls on the discharges of industrial waste waters, loss and destruction of catchment areas, ill-considered siting of industrial plants, deforestation, uncontrolled shifting cultivation and poor agricultural practices. This gives rise to the leaching of nutrients and pesticides. Aquatic ecosystems are disturbed and living freshwater resources are threatened. Under certain circumstances, aquatic ecosystems are also affected by agricultural water resource development projects such as dams, river diversions, water installations and irrigation schemes. Erosion, sedimentation, deforestation and desertification have led to increased land degradation, and the creation of reservoirs has, in some cases, resulted in adverse effects on ecosystems. Many of these problems have arisen from a development model that is environmentally destructive

and from a lack of public awareness and education about surface and groundwater resource protection. Ecological and human health effects are the measurable consequences, although the means to monitor them are inadequate or non-existent in many countries. There is a widespread lack of perception of the linkages between the development, management, use and treatment of water resources and aquatic ecosystems. A preventive approach, where appropriate, is crucial to the avoiding of costly subsequent measures to rehabilitate, treat and develop new water supplies.

Objectives

18.36. The complex interconnectedness of freshwater systems demands that freshwater management be holistic (taking a catchment management approach) and based on a balanced consideration of the needs of people and the environment. The Mar del Plata Action Plan has already recognized the intrinsic linkage between water resource development projects and their significant physical, chemical, biological, health and socio-economic repercussions. The overall environmental health objective was set as follows: "to evaluate the consequences which the various users of water have on the environment, to support measures aimed at controlling water-related diseases, and to protect ecosystems". **1/**

18.37. The extent and severity of contamination of unsaturated zones and aquifers have long been underestimated owing to the relative inaccessibility of aquifers and the lack of reliable information on aquifer systems. The protection of groundwater is therefore an essential element of water resource management.

18.38. Three objectives will have to be pursued concurrently to integrate water-quality elements into water resource management:

(a) Maintenance of ecosystem integrity, according to a management principle of preserving aquatic ecosystems, including living resources, and of effectively protecting them from any form of degradation on a drainage basin basis;

(b) Public health protection, a task requiring not only the provision of safe drinking-water but also the control of disease vectors in the aquatic environment;

(c) Human resources development, a key to capacity-building and a prerequisite for implementing water-quality management.

18.39. All States, according to their capacity and available resources, through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could set the following targets:

(a) To identify the surface and groundwater resources that could be developed for use on a sustainable basis and other major developable water-dependent resources and, simultaneously, to initiate programmes for the protection, conservation and rational use of these resources on a sustainable basis;

(b) To identify all potential sources of water-supply and prepared outlines for their protection, conservation and rational use;

(c) To initiate effective water pollution prevention and control programmes, based on an appropriate mixture of pollution reduction-at-source strategies, environmental impact assessments and enforceable standards for major point-source discharges and high-risk non-point sources, commensurate with their socio-economic development;

(d) To participate, as far as appropriate, in international water-quality monitoring and management programmes such as the Global Water Quality Monitoring Programme (GEMS/WATER), the UNEP Environmentally Sound Management of Inland Waters (EMINWA), the FAO regional inland fishery bodies, and the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention);

(e) To reduce the prevalence of water-associated diseases, starting with the eradication of dracunculiasis (guinea worm disease) and onchocerciasis (river blindness) by the year 2000;

(f) To establish, according to capacities and needs, biological, health, physical and chemical quality criteria for all water bodies (surface and groundwater), with a view to an ongoing improvement of water quality;

(g) To adopt an integrated approach to environmentally sustainable management of water resources, including the protection of aquatic ecosystems and freshwater living resources;

(h) To put in place strategies for the environmentally sound management of freshwaters and related coastal ecosystems, including consideration of fisheries, aquaculture, animal grazing, agricultural activities and biodiversity.

Activities

18.40. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including United Nations and other relevant organizations as appropriate, could implement the following activities:

A) Water resources protection and conservation:

i. Establishment and strengthening of technical and institutional capacities to identify and protect potential sources of water-supply within all sectors of society;
ii. Identification of potential sources of water-supply and preparation of national profiles;
iii. Preparation of national plans for water resources protection and conservation;
iv. Rehabilitation of important, but degraded, catchment areas, particularly on small islands;
v. Strengthening of administrative and legislative measures to prevent encroachment on existing and potentially usable catchment areas;

B) Water pollution prevention and control:

i. Application of the "polluter pays" principle, where appropriate, to all kinds of sources, including on-site and off-site sanitation;

ii. Promotion of the construction of treatment facilities for domestic sewage and industrial effluents and the development of appropriate technologies, taking into account sound traditional and indigenous practices;
iii. Establishment of standards for the discharge of effluents and for the receiving waters;
iv. Introduction of the precautionary approach in water-quality management, where appropriate, with a focus on pollution minimization and prevention through use of new technologies, product and process change, pollution reduction at source and effluent reuse, recycling and recovery, treatment and environmentally safe disposal;
v. Mandatory environmental impact assessment of all major water resource development projects potentially impairing water quality and aquatic ecosystems, combined with the delineation of appropriate remedial measures and a strengthened control of new industrial installations, solid waste landfills and infrastructure development projects;
vi. Use of risk assessment and risk management in reaching decisions in this area and ensuring compliance with those decisions;
vii. Identification and application of best environmental practices at reasonable cost to avoid diffuse pollution, namely, through a limited, rational and planned use of nitrogenous fertilizers and other agrochemicals (pesticides, herbicides) in agricultural practices;
viii. Encouragement and promotion of the use of adequately treated and purified waste waters in agriculture, aquaculture, industry and other sectors;

C) Development and application of clean technology:

i. Control of industrial waste discharges, including low-waste production technologies and water recirculation, in an integrated manner and through application of precautionary measures derived from a broad-based life-cycle analysis;
ii. Treatment of municipal waste water for safe reuse in agriculture and aquaculture;
iii. Development of biotechnology, inter alia, for waste treatment, production of biofertilizers and other activities;
iv. Development of appropriate methods for water pollution control, taking into account sound traditional and indigenous practices;

D) Groundwater protection:

i. Development of agricultural practices that do not degrade groundwaters;
ii. Application of the necessary measures to mitigate saline intrusion into aquifers of small islands and coastal plains as a consequence of sealevel rise or overexploitation of coastal aquifers;
iii. Prevention of aquifer pollution through the regulation of toxic substances that permeate the ground and the establishment of protection zones in groundwater recharge and abstraction areas;
iv. Design and management of landfills based upon sound hydrogeologic information and impact assessment, using the best practicable and best available technology;

v. Promotion of measures to improve the safety and integrity of wells and well-head areas to reduce intrusion of biological pathogens and hazardous chemicals into aquifers at well sites;
vi. Water-quality monitoring, as needed, of surface and groundwaters potentially affected by sites storing toxic and hazardous materials;

E) Protection of aquatic ecosystems:

i. Rehabilitation of polluted and degraded water bodies to restore aquatic habitats and ecosystems;
ii. Rehabilitation programmes for agricultural lands and for other users, taking into account equivalent action for the protection and use of groundwater resources important for agricultural productivity and for the biodiversity of the tropics;
iii. Conservation and protection of wetlands (owing to their ecological and habitat importance for many species), taking into account social and economic factors;
iv. Control of noxious aquatic species that may destroy some other water species;

F) Protection of freshwater living resources:

i. Control and monitoring of water quality to allow for the sustainable development of inland fisheries;
ii. Protection of ecosystems from pollution and degradation for the development of freshwater aquaculture projects;

G) Monitoring and surveillance of water resources and waters receiving wastes:

i. Establishment of networks for the monitoring and continuous surveillance of waters receiving wastes and of point and diffuse sources of pollution;
ii. Promotion and extension of the application of environmental impact assessments of geographical information systems;
iii. Surveillance of pollution sources to improve compliance with standards and regulations and to regulate the issue of discharge permits;
iv. Monitoring of the utilization of chemicals in agriculture that may have an adverse environmental effect;
v. Rational land use to prevent land degradation, erosion and siltation of lakes and other water bodies;

H) Development of national and international legal instruments that may be required to protect the quality of water resources, as appropriate, particularly for:

i. Monitoring and control of pollution and its effects in national and transboundary waters;
ii. Control of long-range atmospheric transport of pollutants;
iii. Control of accidental and/or deliberate spills in national and/or transboundary water bodies;
iv. Environmental impact assessment.

Means of implementation

A) Financing and cost evaluation

18.41. The Conference secretariat has estimated the average total cost (1993-2000) of implementing the activities of this programme to be about $1 billion, including about $340 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific strategies and programmes Governments decide upon for implementation.

B) Scientific and technological means

18.42. States should undertake cooperative research projects to develop solutions to technical problems that are appropriate for the conditions in each watershed or country. States should consider strengthening and developing national research centres linked through networks and supported by regional water research institutes. The North-South twinning of research centres and field studies by international water research institutions should be actively promoted. It is important that a minimum percentage of funds for water resource development projects is allocated to research and development, particularly in externally funded projects.

18.43. Monitoring and assessment of complex aquatic systems often require multidisciplinary studies involving several institutions and scientists in a joint programme. International water-quality programmes, such as GEMS/WATER, should be oriented towards the water-quality of developing countries. User-friendly software and Geographical Information Systems (GIS) and Global Resource Information Database (GRID) methods should be developed for the handling, analysis and interpretation of monitoring data and for the preparation of management strategies.

D) Human resource development

18.44. Innovative approaches should be adopted for professional and managerial staff training in order to cope with changing needs and challenges. Flexibility and adaptability regarding emerging water pollution issues should be developed. Training activities should be undertaken periodically at all levels within the organizations responsible for water-quality management and innovative teaching techniques adopted for specific aspects of water-quality monitoring and control, including development of training skills, in-service training, problem-solving workshops and refresher training courses.

18.45. Suitable approaches include the strengthening and improvement of the human resource capabilities of local Governments in managing water protection, treatment and use, particularly in urban areas, and the establishment of national and regional technical and engineering courses on the subjects of water-quality protection and control at existing schools and education/training courses on water resources protection and conservation for laboratory and field technicians, women and other water-user groups.

D) Capacity-building

18.46. The effective protection of water resources and ecosystems from pollution requires considerable upgrading of most countries' present capacities. Water-quality management programmes require a certain minimum infrastructure and staff to identify and implement technical solutions and to enforce regulatory action. One of the key problems today and for the future is the sustained operation and maintenance of these facilities. In order not to allow resources gained from previous investments to deteriorate further, immediate action is required in a number of areas.

D. Drinking-water supply and sanitation

Basis for action

18.47. Safe water-supplies and environmental sanitation are vital for protecting the environment, improving health and alleviating poverty. Safe water is also crucial to many traditional and cultural activities. An estimated 80 per cent of all diseases and over one third of deaths in developing countries are caused by the consumption of contaminated water, and on average as much as one tenth of each person's productive time is sacrificed to water-related diseases. Concerted efforts during the 1980s brought water and sanitation services to hundreds of millions of the world's poorest people. The most outstanding of these efforts was the launching in 1981 of the International Drinking Water Supply and Sanitation Decade, which resulted from the Mar del Plata Action Plan adopted by the United Nations Water Conference in 1977. The commonly agreed premise was that "all peoples, whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs". **2/** The target of the Decade was to provide safe drinking-water and sanitation to underserved urban and rural areas by 1990, but even the unprecedented progress achieved during the Decade was not enough. One in three people in the developing world still lacks these two most basic requirements for health and dignity. It is also recognized that human excreta and sewage are important causes of the deterioration of water-quality in developing countries, and the introduction of available technologies, including appropriate technologies, and the construction of sewage treatment facilities could bring significant improvement.

Objectives

18.48. The New Delhi Statement (adopted at the Global Consultation on Safe Water and Sanitation for the 1990s, which was held in New Delhi from 10 to 14 September 1990) formalized the need to provide, on a sustainable basis, access to safe water in sufficient quantities and proper sanitation for all, emphasizing the "some for all rather than more for some" approach. Four guiding principles provide for the programme objectives:

(a) Protection of the environment and safeguarding of health through the integrated management of water resources and liquid and solid wastes;

(b) Institutional reforms promoting an integrated approach and including changes in procedures, attitudes and behaviour, and the full participation of women at all levels in sector institutions;

(c) Community management of services, backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programmes;

(d) Sound financial practices, achieved through better management of existing assets, and widespread use of appropriate technologies.

18.49. Past experience has shown that specific targets should be set by each individual country. At the World Summit for Children, in September 1990, heads of State or Government called for both universal access to water-supply and sanitation and the eradication of guinea worm disease by 1995. Even for the more realistic target of achieving full coverage in water-supply by 2025, it is estimated that annual investments must reach double the current levels. One realistic strategy to meet present and future needs, therefore, is to develop lower-cost but adequate services that can be implemented and sustained at the community level.

Activities

18.50. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could implement the following activities:

A) Environment and health:

i) Establishment of protected areas for sources of drinking-water supply;

ii) Sanitary disposal of excreta and sewage, using appropriate systems to treat waste waters in urban and rural areas;

iii) Expansion of urban and rural water-supply and development and expansion of rainwater catchment systems, particularly on small islands, in addition to the reticulated water-supply system;

iv) Building and expansion, where appropriate, of sewage treatment facilities and drainage systems;

v) Treatment and safe reuse of domestic and industrial waste waters in urban and rural areas;

vi) Control of water-associated diseases;

B) People and institutions:

i. Strengthening of the functioning of Governments in water resources management and, at the same time, giving of full recognition to the role of local authorities;
ii. Encouragement of water development and management based on a participatory approach, involving users, planners and policy makers at all levels;
iii. Application of the principle that decisions are to be taken at the lowest appropriate level, with public consultation and involvement of users in the planning and implementation of water projects;

iv. Human resource development at all levels, including special programmes for women;
v. Broad-based education programmes, with particular emphasis on hygiene, local management and risk reduction;
vi. International support mechanisms for programme funding, implementation and follow-up;

C) National and community management:

i. Support and assistance to communities in managing their own systems on a sustainable basis;
ii. Encouragement of the local population, especially women, youth, indigenous people and local communities, in water management;
iii. Linkages between national water plans and community management of local waters;
iv. Integration of community management of water within the context of overall planning;
v. Promotion of primary health and environmental care at the local level, including training for local communities in appropriate water management techniques and primary health care;
vi. Assistance to service agencies in becoming more cost-effective and responsive to consumer needs;
vii. Providing of more attention to underserved rural and low-income periurban areas;
viii. Rehabilitation of defective systems, reduction of wastage and safe reuse of water and waste water;
ix. Programmes for rational water use and ensured operation and maintenance;
x. Research and development of appropriate technical solutions;
xi. Substantially increase urban treatment capacity commensurate with increasing loads;

D) Awareness creation and public information/participation:

i. Strengthening of sector monitoring and information management at subnational and national levels;
ii. Annual processing, analysis and publication of monitoring results at national and local levels as a sector management and advocacy/awareness creation tool;
iii. Use of limited sector indicators at regional and global levels to promote the sector and raise funds;
iv. Improvement of sector coordination, planning and implementation, with the assistance of improved monitoring and information management, to increase the sector's absorptive capacity, particularly in community-based self-help projects.

Means of implementation

A) Financing and cost evaluation

18.51. The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about $20 billion, including about $7.4 billion from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific strategies and programmes Governments decide upon for implementation.

B) Scientific and technological means

18.52. To ensure the feasibility, acceptability and sustainability of planned water-supply services, adopted technologies should be responsive to the needs and constraints imposed by the conditions of the community concerned. Thus, design criteria will involve technical, health, social, economic, provincial, institutional and environmental factors that determine the characteristics, magnitude and cost of the planned system. Relevant international support programmes should address the developing countries concerning, inter alia:

(a) Pursuit of low-cost scientific and technological means, as far as practicable;

(b) Utilization of traditional and indigenous practices, as far as practicable, to maximize and sustain local involvement;

(c) Assistance to country-level technical/scientific institutes to facilitate curricula development to support fields critical to the water and sanitation sector.

C) Human resource development

18.53. To effectively plan and manage water-supply and sanitation at the national, provincial, district and community level, and to utilize funds most effectively, trained professional and technical staff must be developed within each country in sufficient numbers. To do this, countries must establish manpower development plans, taking into consideration present requirements and planned developments. Subsequently, the development and performance of country-level training institutions should be enhanced so that they can play a pivotal role in capacity-building. It is also important that countries provide adequate training for women in the sustainable maintenance of equipment, water resources management and environmental sanitation.

D) Capacity-building

18.54. The implementation of water-supply and sanitation programmes is a national responsibility. To varying degrees, responsibility for the implementation of projects and the operating of systems should be delegated to all administrative levels down to the community and individual served. This also means that national authorities, together with the agencies and bodies of the United Nations system and other external support agencies providing support to national programmes, should develop mechanisms and procedures to collaborate at all levels. This is particularly important if full advantage is to be taken of community-based approaches and self-reliance as tools for sustainability. This will entail a high degree of

community participation, involving women, in the conception, planning, decision-making, implementation and evaluation connected with projects for domestic water-supply and sanitation.

18.55. Overall national capacity-building at all administrative levels, involving institutional development, coordination, human resources, community participation, health and hygiene education and literacy, has to be developed according to its fundamental connection both with any efforts to improve health and socio-economic development through water-supply and sanitation and with their impact on the human environment. Capacity-building should therefore be one of the underlying keys in implementation strategies. Institutional capacity-building should be considered to have an importance equal to that of the sector supplies and equipment component so that funds can be directed to both. This can be undertaken at the planning or programme/project formulation stage, accompanied by a clear definition of objectives and targets. In this regard, technical cooperation among developing countries owing to their available wealth of information and experience and the need to avoid "reinventing the wheel", is crucial. Such a course has proved cost-effective in many country projects already.

E. Water and sustainable urban development

Basis for action

18.56. Early in the next century, more than half of the world's population will be living in urban areas. By the year 2025, that proportion will have risen to 60 per cent, comprising some 5 billion people. Rapid urban population growth and industrialization are putting severe strains on the water resources and environmental protection capabilities of many cities. Special attention needs to be given to the growing effects of urbanization on water demands and usage and to the critical role played by local and municipal authorities in managing the supply, use and overall treatment of water, particularly in developing countries for which special support is needed. Scarcity of freshwater resources and the escalating costs of developing new resources have a considerable impact on national industrial, agricultural and human settlement development and economic growth. Better management of urban water resources, including the elimination of unsustainable consumption patterns, can make a substantial contribution to the alleviation of poverty and improvement of the health and quality of life of the urban and rural poor. A high proportion of large urban agglomerations are located around estuaries and in coastal zones. Such an arrangement leads to pollution from municipal and industrial discharges combined with overexploitation of available water resources and threatens the marine environment and the supply of freshwater resources.

Objectives

18.57. The development objective of this programme is to support local and central Governments' efforts and capacities to sustain national development and productivity through environmentally sound management of water resources for urban use. Supporting this objective is the identification and implementation of strategies and actions to ensure the continued supply of affordable water for present and future needs and to reverse current trends of resource degradation and depletion.

18.58. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could set the following targets:

(a) By the year 2000, to have ensured that all urban residents have access to at least 40 litres per capita per day of safe water and that 75 per cent of the urban population are provided with on-site or community facilities for sanitation;

(b) By the year 2000, to have established and applied quantitative and qualitative discharge standards for municipal and industrial effluents;

(c) By the year 2000, to have ensured that 75 per cent of solid waste generated in urban areas are collected and recycled or disposed of in an environmentally safe way.

Activities

18.59. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could implement the following activities:

A) Protection of water resources from depletion, pollution and degradation:

i. Introduction of sanitary waste disposal facilities based on environmentally sound low-cost and upgradable technologies;
ii. Implementation of urban storm-water run-off and drainage programmes;
iii. Promotion of recycling and reuse of waste water and solid wastes;
iv. Control of industrial pollution sources to protect water resources;
v. Protection of watersheds with respect to depletion and degradation of their forest cover and from harmful upstream activities;
vi. Promotion of research into the contribution of forests to sustainable water resources development;
vii. Encouragement of the best management practices for the use of agrochemicals with a view to minimizing their impact on water resources;

B) Efficient and equitable allocation of water resources:

i. Reconciliation of city development planning with the availability and sustainability of water resources;
ii. Satisfaction of the basic water needs of the urban population;
iii. Introduction of water tariffs, taking into account the circumstances in each country and where affordable, that reflect the marginal and opportunity cost of water, especially for productive activities;

C) Institutional/legal/management reforms:

i. Adoption of a city-wide approach to the management of water resources;
ii. Promotion at the national and local level of the elaboration of land-use plans that give due consideration to water resources development;

iii. Utilization of the skills and potential of non-governmental organizations, the private sector and local people, taking into account the public's and strategic interests in water resources;

D) Promotion of public participation:

i. Initiation of public-awareness campaigns to encourage the public's move towards rational water utilization;
ii. Sensitization of the public to the issue of protecting water quality within the urban environment;
iii. Promotion of public participation in the collection, recycling and elimination of wastes;

E) Support to local capacity-building:

i. Development of legislation and policies to promote investments in urban water and waste management, reflecting the major contribution of cities to national economic development;
ii. Provision of seed money and technical support to the local handling of materials supply and services;
iii. Encouragement, to the extent possible, of autonomy and financial viability of city water, solid waste and sewerage utilities;
iv. Creation and maintenance of a cadre of professionals and semi-professionals, for water, waste-water and solid waste management;

F) Provision of enhanced access to sanitary services:

i. Implementation of water, sanitation and waste management programmes focused on the urban poor;
ii. Making available of low-cost water-supply and sanitation technology choices;
iii. Basing of choice of technology and service levels on user preferences and willingness to pay;
iv. Mobilization and facilitation of the active involvement of women in water management teams;
v. Encouragement and equipment of local water associations and water committees to manage community water-supply systems and communal latrines, with technical back-up available when required;
vi. Consideration of the merits and practicality of rehabilitating existing malfunctioning systems and of correcting operation and maintenance inadequacies.

Means of implementation

A) Financing and cost evaluation

18.60. The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about $20 billion, including about $4.5 billion from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual

costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific strategies and programmes Governments decide upon for implementation.

B) Scientific and technological means

18.61. The 1980s saw considerable progress in the development and application of low-cost water-supply and sanitation technologies. The programme envisages continuation of this work, with particular emphasis on development of appropriate sanitation and waste disposal technologies for low-income high-density urban settlements. There should also be international information exchange, to ensure a widespread recognition among sector professionals of the availability and benefits of appropriate low-cost technologies. The public-awareness campaigns will also include components to overcome user resistance to second-class services by emphasizing the benefits of reliability and sustainability.

C) Human resource development

18.62. Implicit in virtually all elements of this programme is the need for progressive enhancement of the training and career development of personnel at all levels in sector institutions. Specific programme activities will involve the training and retention of staff with skills in community involvement, low-cost technology, financial management, and integrated planning of urban water resources management. Special provision should be made for mobilizing and facilitating the active participation of women, youth, indigenous people and local communities in water management teams and for supporting the development of water associations and water committees, with appropriate training of such personnel as treasurers, secretaries and caretakers. Special education and training programmes for women should be launched with regard to the protection of water resources and water-quality within urban areas.

D) Capacity-building

18.63. In combination with human resource development, strengthening of institutional, legislative and management structures are key elements of the programme. A prerequisite for progress in enhancing access to water and sanitation services is the establishment of an institutional framework that ensures that the real needs and potential contributions of currently unserved populations are reflected in urban development planning. The multisectoral approach, which is a vital part of urban water resources management, requires institutional linkages at the national and city levels, and the programme includes proposals for establishing intersectoral planning groups. Proposals for greater pollution control and prevention depend for their success on the right combination of economic and regulatory mechanisms, backed by adequate monitoring and surveillance and supported by enhanced capacity to address environmental issues on the part of local Governments.

18.64. Establishment of appropriate design standards, water-quality objectives and discharge consents is therefore among the proposed activities. The programme also includes support for strengthening the capability of water and sewerage agencies and for developing their autonomy and financial viability. Operation and maintenance of existing water and sanitation facilities have been recognized as entailing a serious shortcoming in many countries. Technical and financial support are needed to help countries correct present inadequacies and build up the capacity to operate and maintain rehabilitated and new systems.

F. Water for sustainable food production and rural development

Basis for action

18.65. Sustainability of food production increasingly depends on sound and efficient water use and conservation practices consisting primarily of irrigation development and management, including water management with respect to rain-fed areas, livestock water-supply, inland fisheries and agro-forestry. Achieving food security is a high priority in many countries, and agriculture must not only provide food for rising populations, but also save water for other uses. The challenge is to develop and apply water-saving technology and management methods and, through capacity-building, enable communities to introduce institutions and incentives for the rural population to adopt new approaches, for both rain-fed and irrigated agriculture. The rural population must also have better access to a potable water-supply and to sanitation services. It is an immense task but not an impossible one, provided appropriate policies and programmes are adopted at all levels - local, national and international. While significant expansion of the area under rain-fed agriculture has been achieved during the past decade, the productivity response and sustainability of irrigation systems have been constrained by problems of waterlogging and salinization. Financial and market constraints are also a common problem. Soil erosion, mismanagement and overexploitation of natural resources and acute competition for water have all influenced the extent of poverty, hunger and famine in the developing countries. Soil erosion caused by overgrazing of livestock is also often responsible for the siltation of lakes. Most often, the development of irrigation schemes is supported neither by environmental impact assessments identifying hydrologic consequences within watersheds of interbasin transfers, nor by the assessment of social impacts on peoples in river valleys.

18.66. The non-availability of water-supplies of suitable quality is a significant limiting factor to livestock production in many countries, and improper disposal of animal wastes can in certain circumstances result in pollution of water-supplies for both humans and animals. The drinking-water requirements of livestock vary according to species and the environment in which they are kept. It is estimated that the current global livestock drinking-water requirement is about 60 billion litres per day and based on livestock population growth estimates, this daily requirement is predicted to increase by 0.4 billion litres per annum in the foreseeable future.

18.67. Freshwater fisheries in lakes and streams are an important source of food and protein. Fisheries of inland waters should be so managed as to maximize the yield of aquatic food organisms in an environmentally sound manner. This requires the conservation of water-quality and quantity, as well as of the functional morphology of the aquatic environment. On the other hand, fishing and aquaculture may themselves damage the aquatic ecosystem; hence their development should conform to guidelines for impact limitation. Present levels of production from inland fisheries, from both fresh and brackish water, are about 7 million tons per year and could increase to 16 million tons per year by the year 2000; however, any increase in environmental stress could jeopardize this rise.

Objectives

18.68. The key strategic principles for holistic and integrated environmentally sound management of water resources in the rural context may be set forth as follows:

(a) Water should be regarded as a finite resource having an economic value with significant social and economic implications reflecting the importance of meeting basic needs;

(b) Local communities must participate in all phases of water management, ensuring the full involvement of women in view of their crucial role in the practical day-to-day supply, management and use of water;

(c) Water resource management must be developed within a comprehensive set of policies for (i) human health; (ii) food production, preservation and distribution; (iii) disaster mitigation plans; (iv) environmental protection and conservation of the natural resource base;

(d) It is necessary to recognize and actively support the role of rural populations, with particular emphasis on women.

18.69. An International Action Programme on Water and Sustainable Agricultural Development (IAP-WASAD) has been initiated by FAO in cooperation with other international organizations. The main objective of the Action Programme is to assist developing countries in planning, developing and managing water resources on an integrated basis to meet present and future needs for agricultural production, taking into account environmental considerations.

18.70. The Action Programme has developed a framework for sustainable water use in the agricultural sector and identified priority areas for action at national, regional and global levels. Quantitative targets for new irrigation development, improvement of existing irrigation schemes and reclamation of waterlogged and salinized lands through drainage for 130 developing countries are estimated on the basis of food requirements, agro-climatic zones and availability of water and land.

18.71. FAO global projections for irrigation, drainage and small-scale water programmes by the year 2000 for 130 developing countries are as follows: (a) 15.2 million hectares of new irrigation development; (b) 12 million hectares of improvement/modernization of existing schemes; (c) 7 million hectares installed with drainage and water control facilities; and (d) 10 million hectares of small-scale water programmes and conservation.

18.72. The development of new irrigation areas at the above-mentioned level may give rise to environmental concerns in so far as it implies the destruction of wetlands, water pollution, increased sedimentation and a reduction in biodiversity. Therefore, new irrigation schemes should be accompanied by an environmental impact assessment, depending upon the scale of the scheme, in case significant negative environmental impacts are expected. When considering proposals for new irrigation schemes, consideration should also be given to a more rational exploitation, and an increase in the efficiency or productivity, of any existing schemes capable of serving the same localities. Technologies for new irrigation schemes should be thoroughly evaluated, including their potential conflicts with other land uses. The active involvement of water-users groups is a supporting objective.

18.73. It should be ensured that rural communities of all countries, according to their capacities and available resources and taking advantage of international cooperation as appropriate, will have access to safe water in sufficient quantities and adequate sanitation to meet their health needs and maintain the essential qualities of their local environments.

18.74. The objectives with regard to water management for inland fisheries and aquaculture include conservation of water-quality and water-quantity requirements for optimum production and prevention of water pollution by aquacultural activities. The Action Programme seeks to assist member countries in managing the fisheries of inland waters through the promotion of sustainable management of capture fisheries as well as the development of environmentally sound approaches to intensification of aquaculture.

18.75. The objectives with regard to water management for livestock supply are twofold: provision of adequate amounts of drinking-water and safeguarding of drinking-water quality in accordance with the specific needs of different animal species. This entails maximum salinity tolerance levels and the absence of pathogenic organisms. No global targets can be set owing to large regional and intra-country variations.

Activities

18.76. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could implement the following activities:

A) Water-supply and sanitation for the unserved rural poor:

i. Establish national policies and budget priorities with regard to increasing service coverage;
ii. Promote appropriate technologies;
iii. Introduce suitable cost-recovery mechanisms, taking into account efficiency and equity through demand management mechanisms;
iv. Promote community ownership and rights to water-supply and sanitation facilities;
v. Establish monitoring and evaluation systems;
vi. Strengthen the rural water-supply and sanitation sector with emphasis on institutional development, efficient management and an appropriate framework for financing of services;
vii. Increase hygiene education and eliminate disease transmission foci;
viii. Adopt appropriate technologies for water treatment;
ix. Adopt wide-scale environmental management measures to control disease vectors;

B) Water-use efficiency:

i. Increase of efficiency and productivity in agricultural water use for better utilization of limited water resources;
ii. Strengthen water and soil management research under irrigation and rain-fed conditions;
iii. Monitor and evaluate irrigation project performance to ensure, inter alia, the optimal utilization and proper maintenance of the project;
iv. Support water-users groups with a view to improving management performance at the local level;
v. Support the appropriate use of relatively brackish water for irrigation;

C) Waterlogging, salinity control and drainage:

i. Introduce surface drainage in rain-fed agriculture to prevent temporary waterlogging and flooding of lowlands;
ii. Introduce artificial drainage in irrigated and rain-fed agriculture;
iii. Encourage conjunctive use of surface and groundwaters, including monitoring and water-balance studies;
iv. Practise drainage in irrigated areas of arid and semi-arid regions;

D) Water-quality management:

i. Establish and operate cost-effective water-quality monitoring systems for agricultural water uses;
ii. Prevent adverse effects of agricultural activities on water-quality for other social and economic activities and on wetlands, inter alia, through optimal use of on-farm input and the minimization of the use of external input in agricultural activities;
iii. Establish biological, physical and chemical water-quality criteria for agricultural water-users and for marine and riverine ecosystems;
iv. Minimize soil run-off and sedimentation;
v. Dispose properly of sewage from human settlements and of manure produced by intensive livestock breeding;
vi. Minimize adverse effects from agricultural chemicals by use of integrated pest management;
vii. Educate communities about the pollution-related impacts of the use of fertilizers and chemicals on water-quality, food safety and human health;

E) Water resources development programmes:

i. Develop small-scale irrigation and water-supply for humans and livestock and for water and soil conservation;
ii. Formulate large-scale and long-term irrigation development programmes, taking into account their effects on the local level, the economy and the environment;
iii. Promote local initiatives for the integrated development and management of water resources;
iv. Provide adequate technical advice and support and enhancement of institutional collaboration at the local community level;
v. Promote a farming approach for land and water management that takes account of the level of education, the capacity to mobilize local communities and the ecosystem requirements of arid and semi-arid regions;
vi. Plan and develop multi-purpose hydroelectric power schemes, making sure that environmental concerns are duly taken into account;

F) Scarce water resources management:

i. Develop long-term strategies and practical implementation programmes for agricultural water use under scarcity conditions with competing demands for water;
ii. Recognize water as a social, economic and strategic good in irrigation planning and management;

iii. Formulate specialized programmes focused on drought preparedness, with emphasis on food scarcity and environmental safeguards;
iv. Promote and enhance waste-water reuse in agriculture;

G) Water-supply for livestock:

i. Improve quality of water available to livestock, taking into account their tolerance limits;
ii. Increase the quantity of water sources available to livestock, in particular those in extensive grazing systems, in order to both reduce the distance needed to travel for water and to prevent overgrazing around water sources;
iii. Prevent contamination of water sources with animal excrement in order to prevent the spread of diseases, in particular zoonosis;
iv. Encourage multiple use of water-supplies through promotion of integrated agro-livestock-fishery systems;
v. Encourage water spreading schemes for increasing water retention of extensive grasslands to stimulate forage production and prevent run-off;

H) Inland fisheries:

i. Develop the sustainable management of fisheries as part of national water resources planning;
ii. Study specific aspects of the hydrobiology and environmental requirements of key inland fish species in relation to varying water regimes;
iii. Prevent or mitigate modification of aquatic environments by other users or rehabilitate environments subjected to such modification on behalf of the sustainable use and conservation of biological diversity of living aquatic resources;
iv. Develop and disseminate environmentally sound water resources development and management methodologies for the intensification of fish yield from inland waters;
v. Establish and maintain adequate systems for the collection and interpretation of data on water quality and quantity and channel morphology related to the state and management of living aquatic resources, including fisheries;

I) Aquaculture development:

i. Develop environmentally sound aquaculture technologies that are compatible with local, regional and national water resources management plans and take into consideration social factors;
ii. Introduce appropriate aquaculture techniques and related water development and management practices in countries not yet experienced in aquaculture;
iii. Assess environmental impacts of aquaculture with specific reference to commercialized culture units and potential water pollution from processing centres;
iv. Evaluate economic feasibility of aquaculture in relation to alternative use of water, taking into consideration the use of marginal-quality water and investment and operational requirements.

Means of implementation

A) Financing and cost evaluation

18.77. The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about $13.2 billion, including about $4.5 billion from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific strategies and programmes Governments decide upon for implementation.

B) Scientific and technological means

18.78. There is an urgent need for countries to monitor water resources and water-quality, water and land use and crop production; compile inventories of type and extent of agricultural water development and of present and future contributions to sustainable agricultural development; evaluate the potential for fisheries and aquaculture development; and improve the availability and dissemination of data to planners, technicians, farmers and fishermen. Priority requirements for research are as follows:

(a) Identification of critical areas for water-related adaptive research;

(b) Strengthening of the adaptive research capacities of institutions in developing countries;

(c) Enhancement of translation of water-related farming and fishing systems research results into practical and accessible technologies and provision of the support needed for their rapid adoption at the field level.

18.79. Transfer of technology, both horizontal and vertical, needs to be strengthened. Mechanisms to provide credit, input supplies, markets, appropriate pricing and transportation must be developed jointly by countries and external support agencies. Integrated rural water-supply infrastructure, including facilities for water-related education and training and support services for agriculture, should be expanded for multiple uses and should assist in developing the rural economy.

C) Human resource development

18.80. Education and training of human resources should be actively pursued at the national level through: (a) assessment of current and long-term human resources management and training needs; (b) establishment of a national policy for human resources development; and (c) initiation and implementation of training programmes for staff at all levels as well as for farmers. The necessary actions are as follows:

(a) Assess training needs for agricultural water management;

(b) Increase formal and informal training activities;

(c) Develop practical training courses for improving the ability of extension services to disseminate technologies and strengthen farmers' capabilities, with special reference to small-scale producers;

(d) Train staff at all levels, including farmers, fishermen and members of local communities, with particular reference to women;

(e) Increase the opportunities for career development to enhance the capabilities of administrators and officers at all levels involved in land- and water-management programmes.

D) Capacity-building

18.81. The importance of a functional and coherent institutional framework at the national level to promote water and sustainable agricultural development has generally been fully recognized at present. In addition, an adequate legal framework of rules and regulations should be in place to facilitate actions on agricultural water-use, drainage, water-quality management, small-scale water programmes and the functioning of water-users' and fishermen's associations. Legislation specific to the needs of the agricultural water sector should be consistent with, and stem from, general legislation for the management of water resources. Actions should be pursued in the following areas:

(a) Improvement of water-use policies related to agriculture, fisheries and rural development and of legal frameworks for implementing such policies;

(b) Review, strengthening and restructuring, if required, of existing institutions in order to enhance their capacities in water-related activities, while recognizing the need to manage water resources at the lowest appropriate level;

(c) Review and strengthening, where necessary, of organizational structure, functional relationships and linkages among ministries and departments within a given ministry;

(d) Provision of specific measures that require support for institutional strengthening, inter alia, through long-term programme budgeting, staff training, incentives, mobility, equipment and coordination mechanisms;

(e) Enhancement of involvement of the private sector, where appropriate, in human resource development and provision of infrastructure;

(f) Transfer of existing and new water-use technologies by creating mechanisms for cooperation and information exchange among national and regional institutions.

G. Impacts of climate change on water resources

Basis for action

18.82. There is uncertainty with respect to the prediction of climate change at the global level. Although the uncertainties increase greatly at the regional, national and local levels, it is at the national level that the most important decisions would need to be made. Higher temperatures and decreased precipitation would lead to decreased water-supplies and increased water demands; they might cause deterioration in the quality of freshwater bodies, putting strains on the already fragile balance between supply and demand in many countries. Even where precipitation might increase, there is no guarantee that it would occur at the time of year when it could be used; in addition, there might be a likelihood of increased flooding.

Any rise in sealevel will often cause the intrusion of salt water into estuaries, small islands and coastal aquifers and the flooding of low-lying coastal areas; this puts low-lying countries at great risk.

18.83. The Ministerial Declaration of the Second World Climate Conference states that "the potential impact of such climate change could pose an environmental threat of an up to now unknown magnitude ... and could even threaten survival in some small island States and in low-lying coastal, arid and semi-arid areas". **3/** The Conference recognized that among the most important impacts of climate change were its effects on the hydrologic cycle and on water management systems and, through these, on socio-economic systems. Increase in incidence of extremes, such as floods and droughts, would cause increased frequency and severity of disasters. The Conference therefore called for a strengthening of the necessary research and monitoring programmes and the exchange of relevant data and information, these actions to be undertaken at the national, regional and international levels.

Objectives

18.84. The very nature of this topic calls first and foremost for more information about and greater understanding of the threat being faced. This topic may be translated into the following objectives, consistent with the United Nations Framework Convention on Climate Change:

(a) To understand and quantify the threat of the impact of climate change on freshwater resources;

(b) To facilitate the implementation of effective national countermeasures, as and when the threatening impact is seen as sufficiently confirmed to justify such action;

(c) To study the potential impacts of climate change on areas prone to droughts and floods.

Activities

18.85. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could implement the following activities:

(a) Monitor the hydrologic regime, including soil moisture, groundwater balance, penetration and transpiration of water-quality, and related climate factors, especially in the regions and countries most likely to suffer from the adverse effects of climate change and where the localities vulnerable to these effects should therefore be defined;

(b) Develop and apply techniques and methodologies for assessing the potential adverse effects of climate change, through changes in temperature, precipitation and sealevel rise, on freshwater resources and the flood risk;

(c) Initiate case-studies to establish whether there are linkages between climate changes and the current occurrences of droughts and floods in certain regions;

(d) Assess the resulting social, economic and environmental impacts;

(e) Develop and initiate response strategies to counter the adverse effects that are identified, including changing groundwater levels and to mitigate saline intrusion into aquifers;

(f) Develop agricultural activities based on brackish-water use;

(g) Contribute to the research activities under way within the framework of current international programmes.

Means of implementation

A) Financing and cost evaluation

18.86. The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about $100 million, including about $40 million from the international community on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific strategies and programmes Governments decide upon for implementation.

B) Scientific and technological means

18.87. Monitoring of climate change and its impact on freshwater bodies must be closely integrated with national and international programmes for monitoring the environment, in particular those concerned with the atmosphere, as discussed under other sections of Agenda 21, and the hydrosphere, as discussed under programme area B above. The analysis of data for indication of climate change as a basis for developing remedial measures is a complex task. Extensive research is necessary in this area and due account has to be taken of the work of the Intergovernmental Panel on Climate Change (IPCC), the World Climate Programme, the International Geosphere-Biosphere Programme (IGBP) and other relevant international programmes.

18.88. The development and implementation of response strategies requires innovative use of technological means and engineering solutions, including the installation of flood and drought warning systems and the construction of new water resource development projects such as dams, aqueducts, well fields, waste-water treatment plants, desalination works, levees, banks and drainage channels. There is also a need for coordinated research networks such as the International Geosphere-Biosphere Programme/Global Change System for Analysis, Research and Training (IGBP/START) network.

C) Human resource development

18.89. The developmental work and innovation depend for their success on good academic training and staff motivation. International projects can help by enumerating alternatives, but each country needs to establish and implement the necessary policies and to develop its own expertise in the scientific and engineering challenges to be faced, as well as a body of dedicated individuals who are able to interpret the complex issues concerned for those required to make policy decisions. Such specialized personnel need to be trained, hired and retained in service, so that they may serve their countries in these tasks.

D) Capacity-building

18.90. There is a need, however, to build a capacity at the national level to develop, review and implement response strategies. Construction of major engineering works and installation of forecasting systems will require significant strengthening of the agencies responsible, whether in the public or the private sector. Most critical is the requirement for a socio-economic mechanism that can review predictions of the impact of climate change and possible response strategies and make the necessary judgements and decisions.

Notes

1/ Report of the United Nations Water Conference, Mar del Plata, 14-25 March 1977 (United Nations publication, Sales No. E.77.II.A.12), part one, chap. I, sect. C, para. 35.

2/ *Ibid*., part one, chap. I, resolution II.

3/ A/45/696/Add.1, annex III, preamble, para. 2.